Honeywell

Operator's Manual & Service

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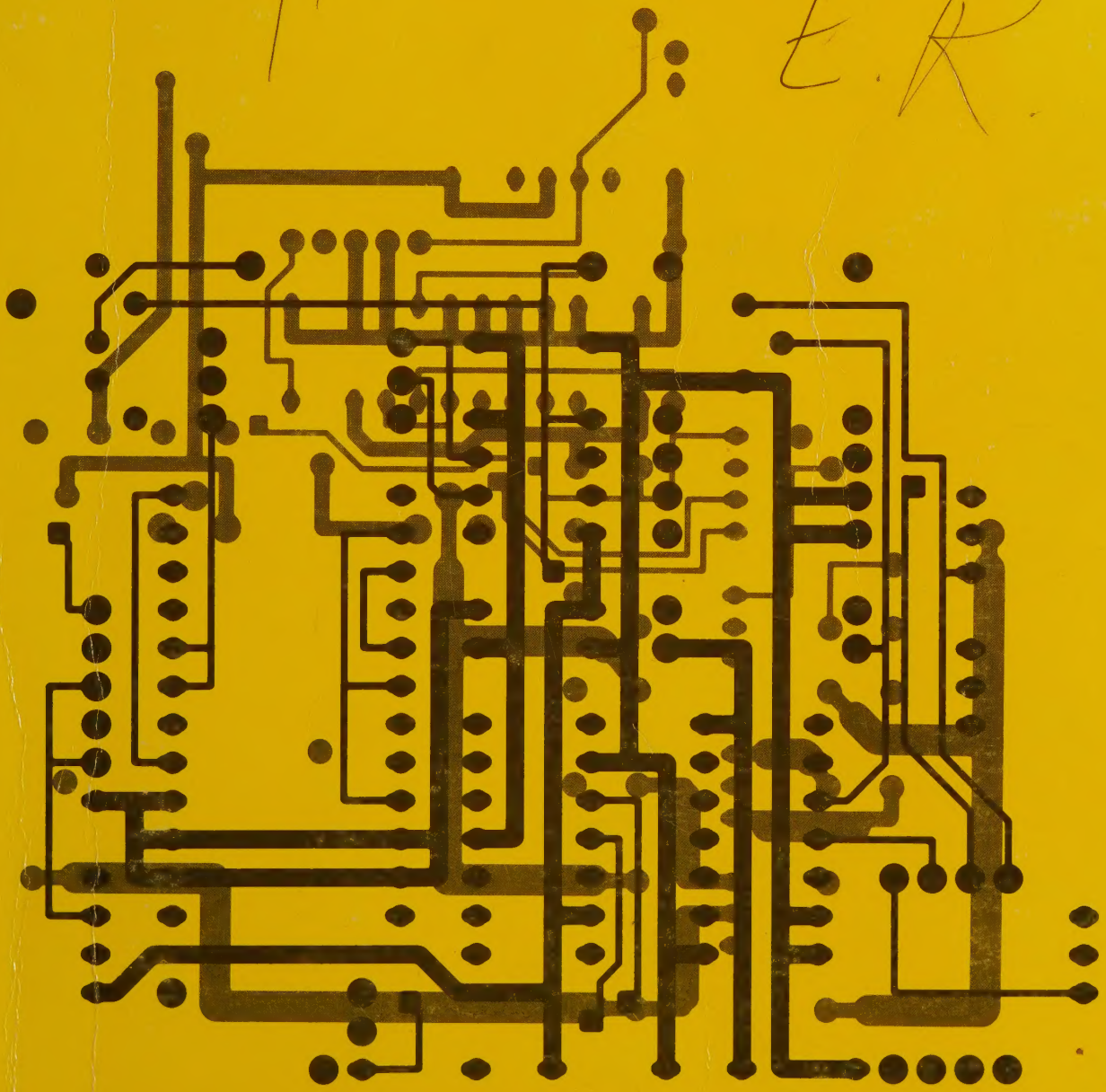


Important notice

The device described herein has been manufactured and tested for correct operation and conformance to our published specifications and is warranted to perform as advertised.

Should your instrument require recalibration after a period of time, you will find instructions covering this procedure in the appropriate section of this manual.

Recalibration, unless required because of a defective component or workmanship, is considered a normal maintenance function.

Replacement of components and assemblies, where examination indicates the normal recommended maintenance practices, described herein, have not been followed, may not be covered by your warranty. In addition, expendable items such as pens, ink pads, slidewire contactor, relay contacts and other components of a similar nature are not normally covered by warranty unless examination reveals that replacement or repair is necessitated due to faulty workmanship or components.

Should you have any questions relative to your warranty, please contact your nearest Honeywell office or write to the Director of Quality Assurance, Honeywell, Fort Washington, Pennsylvania 19034.

For the record . . .

. . . be sure to use Honeywell recording accessories (See back cover for further details.)

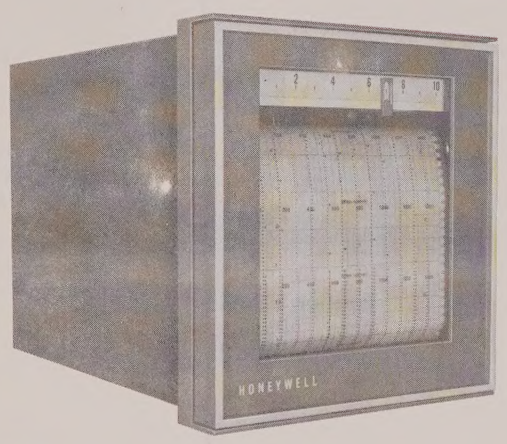
Charts **Pens** **Inks**

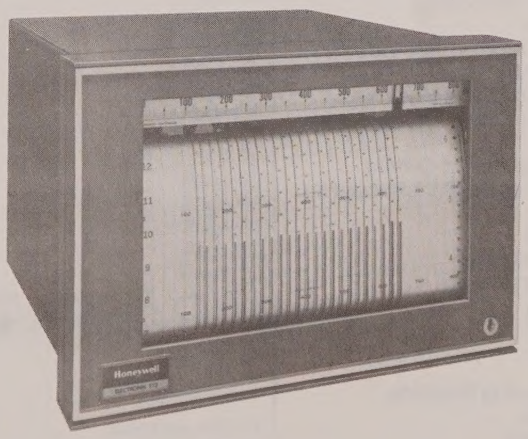
Honeywell

Process Multipoint Recorder Model 111, 112

Operator's Manual

D/120





Process Control Division, 1100 Virginia Drive, Fort Washington, PA 19034
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Process Multipoint Recorder
Models 111 and 112

Specification

Function
Models 111 and 112 Process Multipoint Recorders are designed to accurately measure and clearly record up to 24 variables. They can measure any process variable that can be converted to an equivalent dc mV, dc mA, dc voltage, or resistance range. Multicolor printing enhances identification of overlapping records. Optional functions can be added such as: Dual range/Select-O-Range and features for alarm and control of process activities.

Description
Two basic models are available: Model 111 provides a 6-inch calibrated chart (Figure 1), and Model 112 provides an 11-inch calibrated chart (Figure 2).

Enclosure
The Case is of rugged steel construction, finished in dark beige, with a sheet metal cover over the terminal area and a removable, die-cast, gasketed door. Knockouts for wiring are provided on all four sides around the terminal area. Hardware for panel mounting is provided with each recorder.

Model 111 - Single and Dual Cases
Model 111 is available in single or dual case. The single case, designed for panel mounting, is 10-1/2 inches high for single range and 14 inches high for dual range or Select-O-Range. The dual case is designed for 19 inch relay rack mounting as well as panel mounting. When only one recorder is installed, one side of the case may be used for installation of auxiliary equipment, such as signal conditioning units, alarm devices and control system components.

Model 112 - Single Case
There are two case sizes for Model 112. One is designed for panel mounting or 19-inch relay rack mounting, and the other is narrower for panel mounting only.

Chassis
The drawer-type, cast aluminum chassis slides forward for routine maintenance without interrupting operation. Display and measuring system components are mounted on the chassis. Display components include the chart, scale, chart drive motor and gear mechanism, chart transport, and printing system. Measuring system components include the input selector switch, measuring circuit including the slidewire, servo amplifier, and servo drive components. Chassis electronics interface with the input terminal panel through the drawbridge connector and input selector switch ribbon assembly. The drawbridge connector and switch assembly permit quick removal and replacement of the chassis, or interchange with any other chassis having identical electrical features.

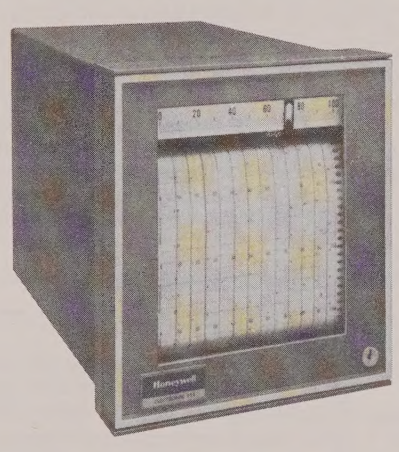

Figure 1 – Model 111 Process Multipoint Recorder

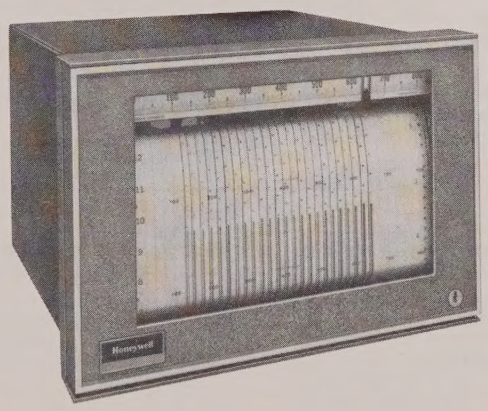

Figure 2 – Model 112 Process Multipoint Recorder

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Display

- Scales and charts are available for thousands of ranges for thermocouples, RTD, RH, pH, pressure, flow, level, mV, mA.
- Synchronous motor chart drives have a variety of speeds to meet specific recording needs. Simple gear change for chart speeds of 1/2 or 2 times basic speed. Chart drive switch is accessible from the front of the instrument.
- Chart transport unlatches and rotates forward for easy loading while the instrument is operating. The transport can be easily removed for loading, servicing, or gaining access to the components mounted behind it.
- Print motor drives the selector switch and print head by means of a toothed belt, guaranteeing correct synchronization.
- Die cast metal, dot-and-number print wheel is directly linked with the input selector switch. The ink wheel is replaced in seconds, and a slot on its hub assures positive alignment. Ink wheel can be multicolor or single color.
- Select-O-Trend recording aids trace identification. A toggle on the print mechanism selects a numbered dot for each printed point, or a numbered dot for every 13th printed point.

Measuring System

- Slidewire is low maintenance, infinite resolution, conductive, plastic. Collector consists of four-fingered gold-alloy contacts.
- Input selector switch is a precision printed circuit switch plated with precious metals. The switch is driven by a toothed belt and a geneva advance mechanism. A clear plastic protective housing permits inspection without disassembly.
- Power switch and dual range switch are accessible from the front of the instrument.
- Servo electronics, input cables, dual range amplifier, and measuring circuit components are enclosed in a full floating Faraday shield. This shield, in combination with an input filter, provides protection from the effects of common mode stray on the input circuit.
- The dual range and Select-O-Range amplifier uses all solid state components. These components are on a single printed wiring board which is mounted in a shielded box on the underside of the chassis. Zero and span adjustments are provided for both ranges.
- The servo amplifier uses all solid state components, including a transistor-type chopper. All components are mounted on a single printed wiring board for ease of servicing. A gain adjustment on all amplifiers is accessible from the front of the instrument. A damping adjustment, provided with 1-second span step response time is located conveniently on the front of instruments having spans less than 5 mV.
- A cascade zener diode network supplies a constant voltage to the precision thick film resistor network on the measuring circuit. Adjustable zero and span adjustments for calibration are accessible from the front of the instrument.

Control Selection

LEGEND

1. First switch is factory set to operate at index, switches can be positioned up to ±10 per cent from index (Table 1).
2. Up to four frontset switches can be supplied. Switch is an SPDT MICRO SWITCH unit with contact rating of 5 amperes at 120 Vac, non-inductive load.
3. Index (set point) knob positions all frontset switches, maintaining pre-set zone widths as index is changed. Index is adjustable from 2 to 98 per cent of scale.
4. Control error signal generator.

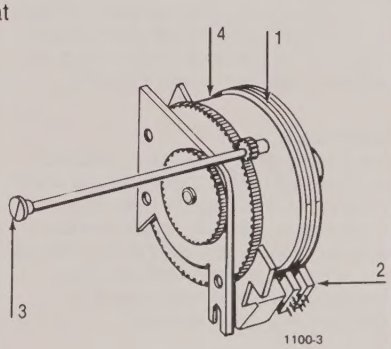


Figure 3 – Electric Contact Control (Frontset Switches)

TABLE 1 - Summary of Operation - Frontset Switches

Number of Switches	Switch Operation	Schematic
1	Operates at index.	
2	1st operates at index, 2nd factory set to operate 10% above index.	
3	1st operates at index, 2nd and 3rd factory set to operate 10% above and 10% below index respectively.	
4	1st operates at index, 2nd and 3rd factory set to operate 10% above and 10% below index respectively. 4th set to operate 5% below index.	

Specifications

Operating Conditions

	Reference Conditions	Rated Conditions	Extreme Conditions	Transportation and Storage Conditions
Ambient Temperature	23 ±1°C	15 to 40°C	−9 to 60°C	−40 to 70°C
Relative Humidity (% RH)	10–55	10–90	5–95	5–100
Vibration				
Frequency (cps)	0	0–70	0–200	0–200
Acceleration (g)	0	0.1 (30 mil. peak to peak max.)	0.2 (30 mil. peak to peak max.)	1
Shock				
Acceleration (g)	0	1	5	20
Duration (ms)	0	30	30	30
Mounting Position From Vertical				
Tilted Forward	3°	10°	15°	——
Tilted Backward	10°	10°	45°	——
Tilted Any Other Position	——	10°	10°	——

Performance (Recorder)

Accuracy

Single Range

Spans 5 millivolts or greater: ±(0.3 + 0.1 x suppression ratio)% of span or 0.02 millivolts, whichever is greater.

Spans less than 5 millivolts: ±(0.3 + 0.1 x suppression ratio)% of span + 0.005 millivolts.

Resistance Thermometer: % of span in ohms = ±(0.3 + 0.01 x suppression ratio)

Dual Range or Select-O-Range

Type J, K, T, E or W5W26, Thermocouple input:

± (0.35 ±0.05 X suppression ratio) % of span

or

$$\pm\left(\frac{4.5}{\text{span (mv)}} \pm 0.05 \text{ X suppression ratio}\right)\% \text{ of span}$$

whichever is greater.

mA, mV, R T/C, S T/C inputs:

± (0.35± 0.05 X suppression ratio) % of span

or

$$\pm\left(\frac{3.0}{\text{span (mv)}} \pm 0.05 \text{ X suppression ratio}\right)\% \text{ of span}$$

whichever is greater

Reproducibility

±0.15% of span (24 hour)

Dead Band

0.1% of span

Span Step-Response-Time Rating

1 second or 3 seconds – 60 Hz
1.2 seconds or 3.6 seconds – 50 Hz

Actuation and Input Range

Actuation	Single Range	Dual Range or Select-O-Range	Suppression
Thermocouple*	1 to 100 mV	5 to 100 mV	2 times span
Radiamatic without Calibration Rheostat	1 to 100 mV	——	2 times span
DC Current	5μA to 100 mA	2 mA to 100 mA	2 times span
DC Volts	0.1 to 200V	5 mV to 10V	2 times span**
Resistance Thermometer	3 to 1000 ohms	——	20:1 Ratio

*Universal reference junction compensated within ±0.014 mV for types E, J, K, T, or W5W26; ±0.0025 mV for types R or S.

**Suppression of 2 times span as long as V max and V min do not exceed ±10V.

Span and Zero Adjustment	±10% of span
Print Cycle Time	*With Standard Select-O-Print Recording (fixed print cycle)* 60 Hz – 2, 5, or 15 seconds 50 Hz – 2.4, 6, or 18 seconds *With Accelerated Select-O-Print Recording (switch selectable print cycle)* 50 or 60 Hz – 2, 5, 15, 30, or 60 seconds
Carriage Travel Range	0 to 98% of scale
Source Resistance Rating	For zero offset no greater than 1/2 dead band on millivolt and thermocouple spans: 5000 ohms maximum on spans less than 5 mV or response time of 1 second full scale 2000 ohms maximum on spans 5 mV or greater and response time of 3 seconds full scale
Off Balance Input Resistance	40K ohms minimum on spans less than 5 mV 200K ohms minimum on spans 5 mV or greater *Dual Range or Select-O-Range* ⩾25M ohms minimum with spans ⩽100 mV ⩾20K ohms minimum with spans ⩾100 mV
Interference (Stray) Rejection	*Normal Mode (Transverse)* 60 Hz: 0.5 times span 50 Hz: 0.2 times span *Common Mode (Longitudinal)* 60 Hz: To 120 volts rms 50 Hz: To 50 volts rms DC: 240 times span to 240 volts max.
Power Requirements	Rated: 110 to 125 Vac, 60/50 Hz Extreme: 100 to 130 Vac
Power Consumption	22 VA maximum; add 10 VA for internal illumination.
Performance (Electric Contact Control)	
Index Adjustment	2 to 98% of scale
Contact Rating	5 amps, 120 Vac, non-inductive load
Design	
Print Cycle Time/Point	*Select-O-Trend* 60 Hz: 2, 5, or 15 seconds 50 Hz: 2.4, 6, or 18 seconds *Optional Select-O-Print with Fixed Print Cycle* 60 Hz: 5 or 15 seconds 50 Hz: 6 or 18 seconds *Optional Accelerated Select-O-Print* 50/60 Hz: 2, 5, 15, 30, and 60 seconds; or 5, 15, 30, and 60 seconds – switch selectable.
Chart Speed	1, 2, 6, 10, 12, or 20 inches/hour Change gears supplied for chart speeds 1/2 or 2 times basic speed.
Number of Records	2, 3, 4, 6, 12, or 24 with single or multicolor printing, as specified.
Chart and Scale	*Model 111* Calibrated width: 6 inches (152 mm) Chart length: 122 feet (31 m) *Model 112* Calibrated width: 11 inches (279 mm) Chart length: 122 feet (31 m)
Case	Sheet steel finished in dark beige
Door	Removable; opens to 125 degrees; gasketed, 3.175 mm (1/8 inch) thick glass window.
Input Terminal Panel	Panel accessible from rear of instrument. Accepts input signals from up to 24 sources. Includes an integral heat sink containing an embedded universal reference junction resistor which minimizes the effect of changes in ambient temperature. Large screw terminals facilitate installation and signal input connections.
Dimensions	Refer to Figures 4, 5, 6, 7 and 8.
Weight	*Model 111:* 17.2 kg (38 lb) *Model 112:* 20.4 kg (45 lb)
Accessories	Chart roll, lubricating oil, mounting accessories, and instructions.

Options

Operation

Chart Speed Change Gears Installed
Change gears are factory installed for two or one-half times basic chart speed as specified.

Select-O-Print
Permits selection of records of interest, skips all others. Two versions are available:

- ***Accelerated*** – Skips 2 points per second. Selector tabs on program wheel simplify point selection — visually indicate points printed or skipped. Hold switch permits continuous indication of one point without printing.
- ***Fixed Print Cycle*** – Same point-skipping feature as accelerated Select-O-Print. Skips points at the rate of 5 or 15 seconds per point.

Dual Range
- ***Manual Range Selection*** – A two position switch on front of instrument determines which range is selected.
- ***Select-O-Range*** – Selector tabs on program wheel permit convenient, quick range to channel assignment. Any combination of range to channel selection is possible.

Transmitting Slidewires
One or two slidewires on servo shaft with 100, 500, 1000, or 5000 ohms resistance. With or without adjustable end resistance (approximately 5 per cent at each end). Provide electric signal proportional to the process variable. Both slidewires must have same resistance.

Backset Switch
SPDT MICRO SWITCH units are used as auxiliary control devices to operate alarm systems to provide on-off control action to remote control points. Mounted on back of the chassis, the contact operating points are individually adjustable (0-98 per cent full scale) and are independent of the frontset index (SEE Table 2). MICRO SWITCH units are rated 5 amperes, 120 Volts ac, non-inductive load.

NOTE: Combination of frontset and backset switches are limited to four.

Approval Body Listings
Canadian Standards Association and Factory Mutual approval for "general purpose electrical equipment for ordinary locations."

Power

220/240 Volts
Internally mounted step-down transformer.

No Power Switch
Prevents unauthorized interference with instrument operation.

No Chart Drive Switch
Prevents unauthorized interference with instrument operation.

Wired for Remote Chart Drive Switch
Terminals provided for a remotely located switch.

Case

Fluorescent Illumination
Illuminates chart and scale.

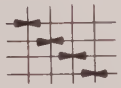
Door Lock
Prevents unauthorized tampering with performance adjustments and control settings. All locks operate from a universal type key. Two keys furnished.

Auxiliary Nameplate
Engraved with special identification as specified on sales order.

External Set Point Knob
For convenience of changing control set point without opening door (on control models only).

Color
Case and door color other than standard beige.

TABLE 2 – Summary of Operation – Backset Switches

Number of Switches	Schematic
1	
2	
3	
4	

Special Option

Selective Alarm with momentary, automatic, or manual reset can isolate specific alarm points. Alarm relays can activate visual or audible alarms or initiate control action when the selected record (PV) exceeds a set point or falls below it. Up to 10 alarm relays are mounted internally and shipped prewired; alarm assignments are easily changed in the field. Up to 24 relays can be mounted in a separate enclosure. Refer to Product Data Sheet PD-12-2 for more information.

Dimensions: millimetres / inches

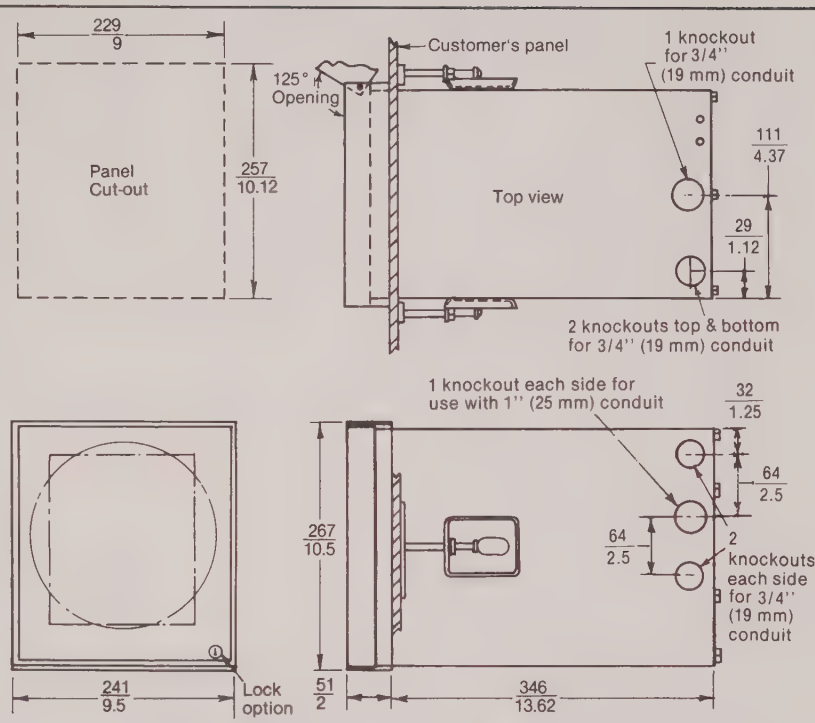


Figure 4 – Dimensions, Model 111 Single Case

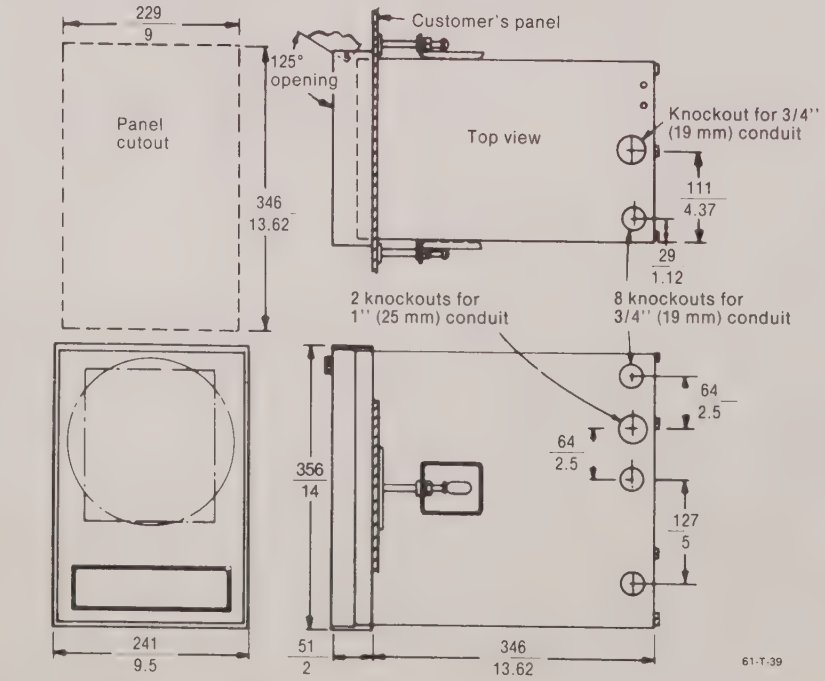


Figure 5 – Model 111 – High Case

Dimensions: millimetres / inches

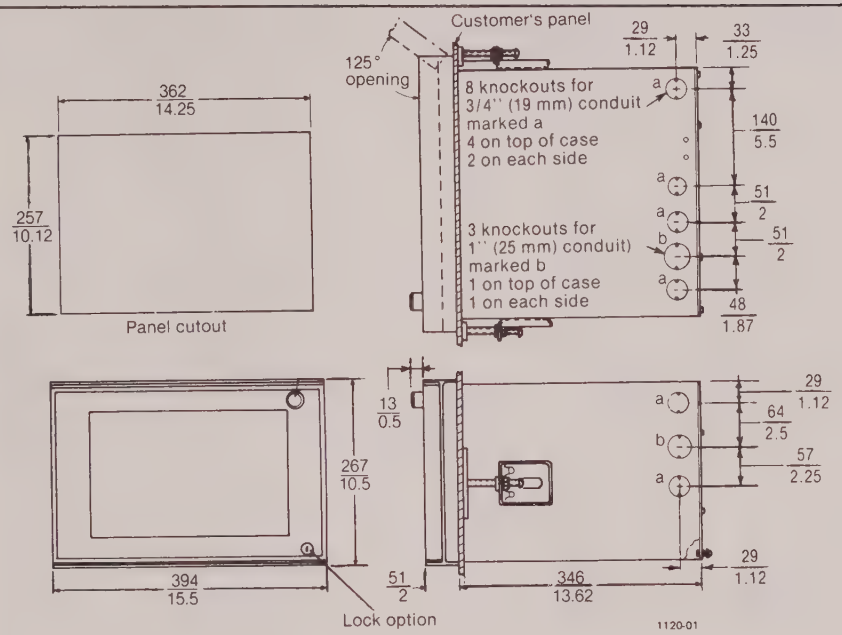


Figure 6 – Dimensions, Model 112 Panel Mount Case

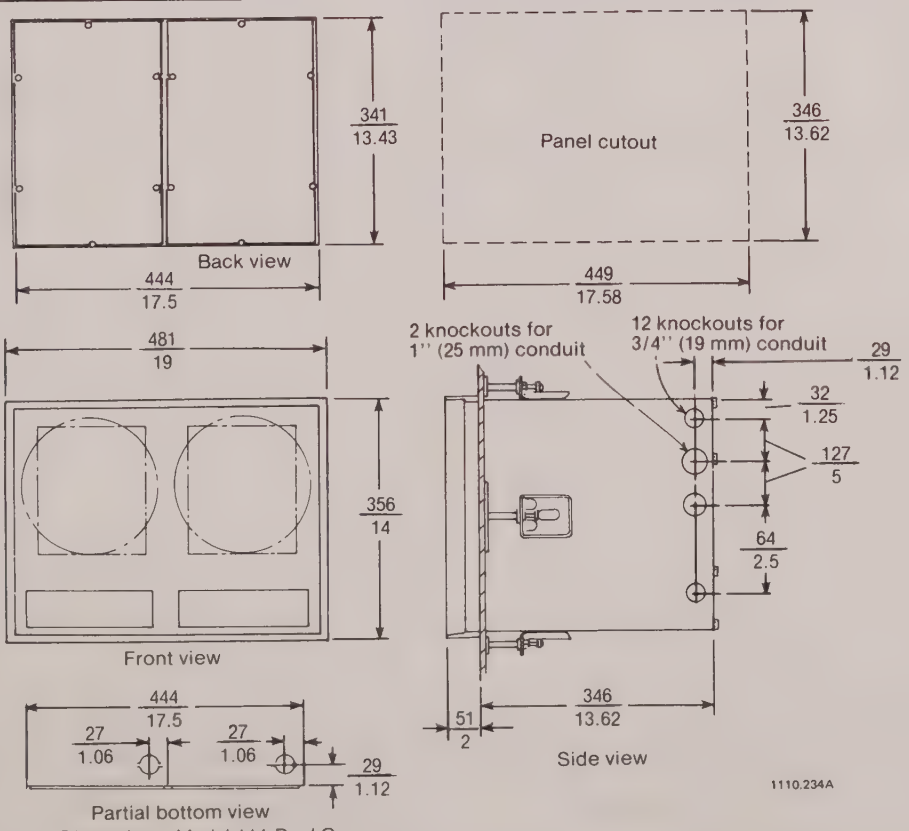


Figure 7 – Dimensions, Model 111 Dual Case

Dimensions: millimetres / inches

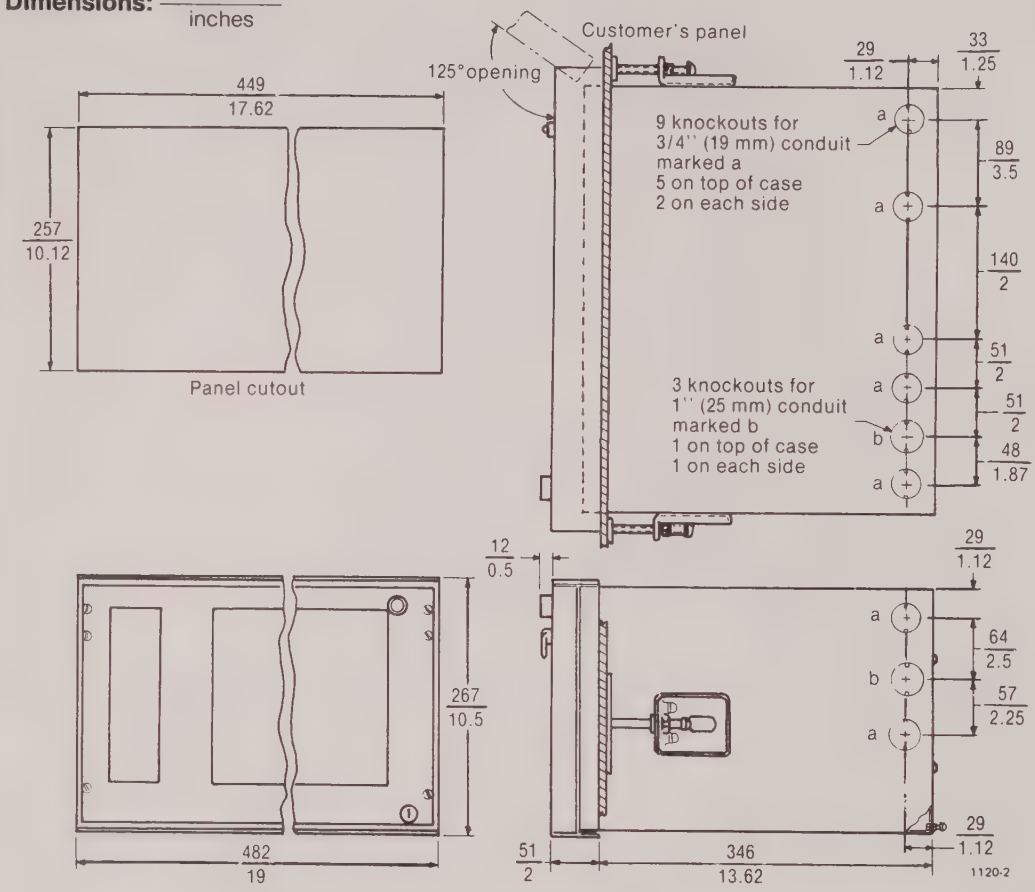


Figure 8 – Model 112 – Panel or Relay Rack Mount Case

Ordering Information

Please specify:

Process Multipoint Recorder, Model Number:
- 1117018X – non-control
- 1117113X – contact control
- 1127418X – non-control
- 1127513X – contact control

Actuation (input type)
Operating voltage and frequency
Number of records
Print cycle speed
Backset switches
Chart speed
Control form if required
Options as desired

For complete ordering information, request Model Selection Guide: 011-284 for Model 111/112 Process Multipoint Recorder. For more information, contact the nearest Honeywell sales office or Honeywell Process Control Division, 1100 Virginia Drive, Fort Washington, Pa. 19034.

In Canada, Honeywell Limited, Suite 301, 1200 Markham Road, Scarborough, Ontario M1H 3C3.

Specifications are subject to change without notice.

Honeywell

Model 111/112 Process Multipoint Recorder

Model Selection Guide

Specifications:
42-11-03-03

Instruction

- Select the desired key number. The arrow to the right marks the selections available.
- Make one selection from each Table, I through VI, using the column below the proper arrow. Select as many Table VII options as desired. A dot (•) denotes unrestricted availability. A letter (**b**) denotes restricted availability. Restrictions follow Table VII, with squares (■) on the vertical line below a letter identifying the limitations.
- Refer to Supplementary Ordering Data for additional information to be supplied with an order.
- A complete model number must have the designated number of digits in each table. Dual case instruments require a separate model number for each chassis.

Key Number ┌─I─┐ ┌─II─┐ ┌─III─┐ ┌─IV─┐ ┌─V─┐ ┌─VI─┐ ┌─VII─┐
_____ - _____ - _____ - __ - _____ - ___ - __ - ___,___

Key Number

Chart Width	Control Type		Selection	Availability			
6 Inch Narrow Chart	None		1117418__	↓			
	Electric Contact		1117513__		↓		
11 Inch Wide Chart	None		1127418__			↓	
	Electric Contact		1127513__				↓
Single Case	10-1/2 Inches High		_____0	•	•		
	14 In. High Dual Range or Select-O-Range		_____3	•	•		
Dual Case 14 Inch High	Chassis Installed In Left Side	Right Side for Strip Chart Chassis	_____5	•	•		
		Right Side with Blank Panel in door	_____7	•	•		
Chassis Only		For Right Side of Dual Case	_____4	•	•		
15-1/2 Inch Wide Case			_____0			•	•
19 Inch Wide Case			_____1			•	•

Table I Measuring Circuit Print Cycle Time

	Minimum	Maximum	Burnout					
Millivolt Span	1 Millivolt	Less Than 5 Millivolts	None	1 ____	•	•	•	•
			Upscale	2 ____	•	•	•	•
			Downscale	3 ____	•	•	•	•
	5 Millivolts	100 Millivolts	None	4 ____	•	•	•	•
			Upscale	5 ____	•	•	•	•
			Downscale	6 ____	•	•	•	•

	50 Hertz	60 Hertz					
Print Cycle Time in Seconds	18	15	__2 ___	m	m	m	m
	6	5	__3 ___	n	n	n	n
	6	5	__9 ___	u	u	u	u
	2.4	2	__4 ___	n	n	n	n
	Switch Selectable	5, 15, 30, 60	__A ___	v	v	v	v
		2, 5, 15, 30, 60	__B ___	v	v	v	v

Process Control Division, 1100 Virginia Drive, Fort Washington, PA 19034

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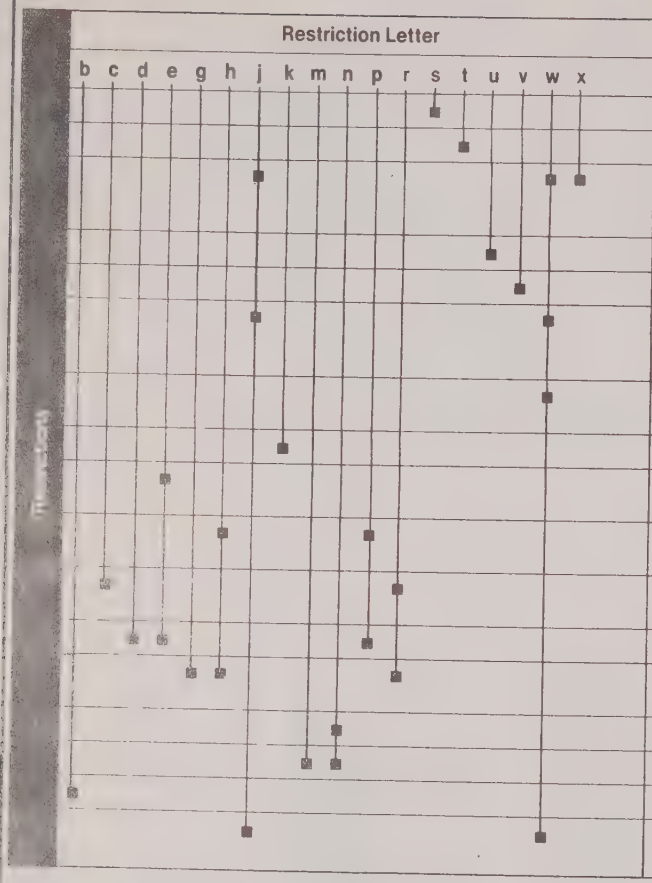
					Selection	Availability			
						1 1 1 7 4 1 8	1 1 1 7 5 1 3	1 1 2 7 4 1 8	1 1 2 7 5 1 3
Table I Measuring Circuit Print Cycle Time Continued	Actuation	Thermocouple			___0 2 0	•	•	•	•
		Millivolts			__0 1 0	•	•	•	•
		Radiamatic Radiation Pyrometer without Calibrating Rheostat			__0 1 0	•	•	•	•
		Resistance Thermometer			4 __0 6 0	•	•	•	•
		Dc Current	To 100 Milliamps		4 __0 5 0	•	•	•	•
			4 to 20 Milliamps		4 __0 8 0	•	•	•	•
		Dc Volts (Span Limits 0 1 to 300 Volts)			4 _0 7 0	•	•	•	•
		Dual Range or Select-O-Range	Span Limits	Thermocouple: 5 to 100 mV DC Current: 2 mA to 100 mA DC Volts: 5 mV to 10V Millivolts: 5 to 100 mV (Suppression: 2 Times Span Max.) Requires Table VII Selection 211, 212, 214 or 215	__O D O	w	w	j	j
Table II	No Selection				00000	•	•	•	•
Table III	No Selection				00	•	•	•	•
Table IV Contact Control	No Frontset Control				0 0 0 ___	•		•	
	Frontset Contact				5 0 ____		•		•
	Electric Contact Control	Frontset Zone Switches		One	___1 ___		c		c
				Two	___2 ___		c		c
				Three	___3 ___		c		c
				Four	___4 ___		c		c
	Auxiliary Contact Control	Backset Switches		None	____0 0	•	•	•	•
				One	____1 0	•	c	•	c
				Two	____2 0	•	c	•	c
				Three	____3 0	•	c	•	c
				Four	____4 0	•	c	•	c
Table V Chart Drive	Frequency			60 Hertz	1 ___	•	•	•	•
				50 Hertz	2 ___	•	•	•	•
	Single Speed with 1/2X and 2X Change Gears	Basic Speed	Inches/Hour						
			1		__0 1	•	•	•	•
			2		__0 2	•	•	•	•
			6		__0 6	•	•	•	•
			10		__1 0	•	•	•	•
			12		__1 2	•	•	•	•
			20		__2 0	•	•	•	•
Table VI Number of Records	Single Color		Number of Records						
			2		10	•	•	•	•
			3		11	•	•	•	•
			4		20	•	•	•	•
			6		12	•	•	•	•
			12		13	•	•	•	•
			24		14	k	k	k	k
	Multicolor		2		15	•	•	•	•
			3		16	•	•	•	•
			4		21	•	•	•	•
			6		17	•	•	•	•
			12		18	•	•	•	•
			24		19	k	k	k	k

Table VII Options

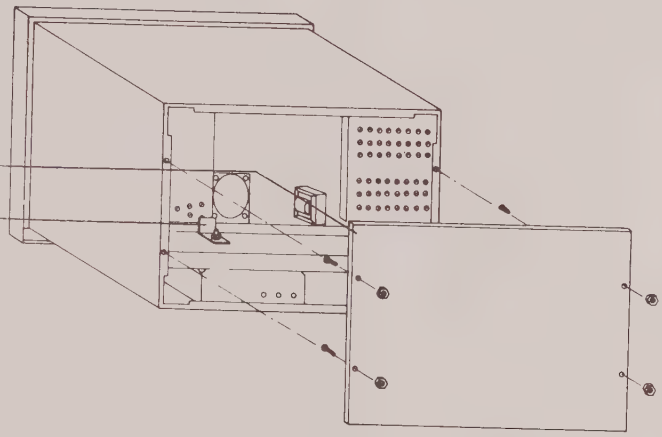
			Selection	Availability 1117418	1175138	1127418	1127538	
Case								
Fluorescent Illumination			002	•	•	•	•	
Door Lock			010	•	•	•	•	
Auxiliary Nameplate			055	•	•	•	•	
External Set Point Knob			401		•		•	
Color: Black instead of Standard Beige			099	•	•	•	•	
Power								
Internal Transformer for 220/240 Volts			020			•	•	
No Power Switch			150	•	•	•	•	
No Chart Drive Switch			153	•	•	•	•	b
Wired for Remote Chart Drive Switch			152	•	•	•	•	b
Operation								
Chart Speed Change Gears Installed	1/2 Times Basic		204	•	•	•	•	b
	2 Times Basic		205	•	•	•	•	b
Select-O-Print	Fixed Cycle		201	s	s	s	s	b
	Accelerated		202	t	t	t	t	b
One Transmitting Slidewire		**Ohms**						
	Without End Adjustment	100	501	g	r	g	r	b
		500	502	g	r	g	r	
		1000	503	g	r	g	r	
		5000	504	g	r	g	r	
	With Adjustment Both Ends	100	505	g	h	g	h	
		500	506	g	h	g	h	
		1000	507	g	h	g	h	
		5000	508	g	h	g	h	
Two Transmitting Slidewires (Same Resistance)	Without End Adjustment	100	521	d	p	d	p	
		500	522	d	p	d	p	
		1000	523	d	p	d	p	
		5000	524	d	p	d	p	
	With Adjustment Both Ends on Slidewire #1 Only	100	525	d	e	d	e	
		500	526	d	e	d	e	
		1000	527	d	e	d	e	
		5000	528	d	e	d	e	
Approval Body	**Location**							
Canadian Standards Association	Ordinary		C300	•	•	•	•	b
Factory Mutual	Ordinary		F300	•	•	•	•	b
Dual Range			211	x	x	x	x	b
Select-O-Range			212	x	x	x	x	
Dual Range with Current Actuation			214	x	x	x	x	
Select-O-Range with Current Actuation			215	x	x	x	x	



Available Only With		Not Available With	
Table	Selection	Table	Selection
I	X2XXX, X9XXX		
I	XAXXX, XBXXX		
I	4__ODO, 5__ODO, 6__ODO	IV	More than 3 backset switches
VII	201		
VII	202		
VII	Must specify 211, 212, 214 or 215		
		Key No.	XXXXXXX0
		I	4X050, 4X060, 4X080
		IV	More than 2 switches, frontset plus backset
		IV	More than 3 switches, frontset plus backset
		IV	More than 4 switches, frontset plus backset
		IV	More than 1 backset switch
		IV	More than 2 backset switches
		VII	201
		VII	202
Select only one option from this group.			
Burnout is only operational on T/C and DC Volt Actuations less than or equal to 100 mV spans.			

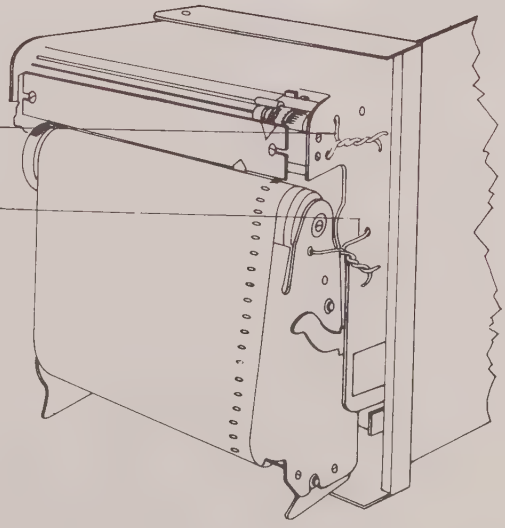
This Operator's Manual contains specifications, installation, operation, maintenance, calibration, and limited service information for Model 111 intermediate size and Model 112 wide chart mechanically programmed process multipoint recorders. It includes information concerning the basic instrument and the options that are available. Use the model number interpretation sheet to determine the features of your instrument. Use the table of contents to find data relative to a particular feature.
Theoretical and more detailed service data is in the Model 111/112 service manual. To order, use the form at the rear of this manual.

Model 111 Unpacking



1 Remove rear cover from instrument.

2 Remove shipping bracket, screws and washers which secure chassis to case. It is located in the rear, approximately 2-1/2" in from left side of case.



3 Lift chassis latch in lower right corner. Pull chassis out of case to service stop. Remove card board fillers.

4 Remove tie wrap that secures carriage to right side plate.

5 Remove tie wrap that secures chart transport to right side plate.

6 Remove cardboard filler from left edge of door glass.

7 Lower chart transport and remove tie wrap from around orbital rod and drive rod.

8 Remove tie wrap from around carriage jaws above orbital rod.

Figure 1

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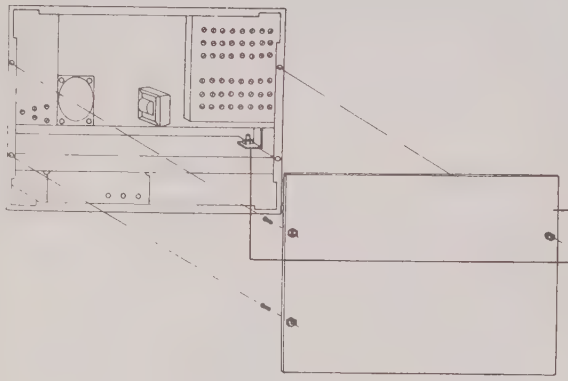
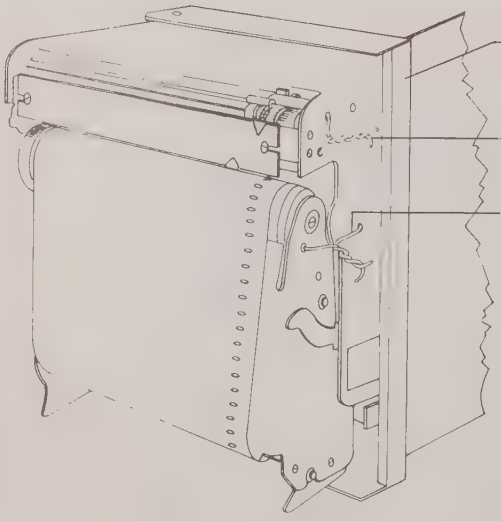
Model 112 Unpacking



1
Remove rear cover from instrument.

2
Remove shipping screws and washers from brackets on both sides of chassis in rear.



3
Lift chassis latch in lower right corner. Pull chassis out of case to service stop. Remove cardboard fillers.

4
Remove tie wrap that secures carriage to right side plate.

5
Remove tie wrap that secures chart transport to right side plate.

6
Lower chart transport and remove tie wrap from around orbital rod and drive rod.

7
Remove tie wrap from around carriage jaws above orbital rod.

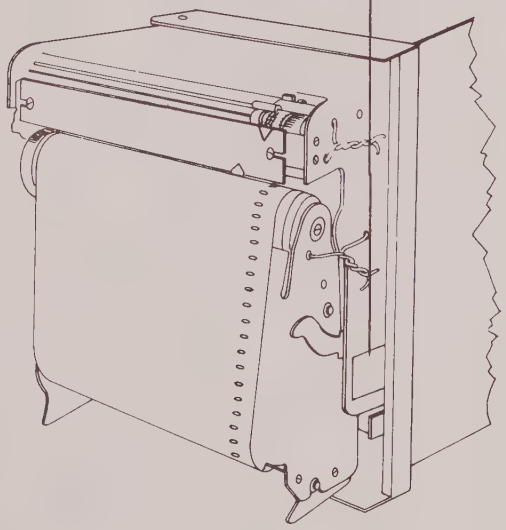
Figure 2

Model Number Interpretation

1
The model number identifies the features and options for each instrument.

2
This number is stamped on the identification plate located on the right side of the chassis.

3
For reference, partially withdraw the chassis from the case. Copy the model number from the plate into the blocks at the bottom of this page. The model selection page lists all the features and options for the instrument described herein.



4
If the letter "Y" preceeds the model number on the identification plate, the instrument has special features not covered by the standard model number. Instructions for the "special" features are located at the front of this manual.

Key Number	I	II	III	IV	V	VI	VII

Figure 3

Select Location

Select an area as close as practicable to the process variable. Ambient temperature of a clean, dry area should not exceed recommended instrument limits of 15°C to 40°C (58°F to 104°F). Extreme temperatures of –9°C to +60°C (16°F to 140°F) can be tolerated without failure, but the accuracy could be degraded.

Mounting

***1.** Open Instrument*

Press fingers firmly against right edge of door and pull forward. Swing door open to the left.

***2.** Remove Door*

(1)
Swing lever on top hinge pin away from door face and press it down.

(2)
Pull top of door clear from case and lift from bottom hinge.

***4.** Mounting Case*

(1)
Refer to drawings section in this manual for dimension drawings. These will furnish dimensions of enclosure.

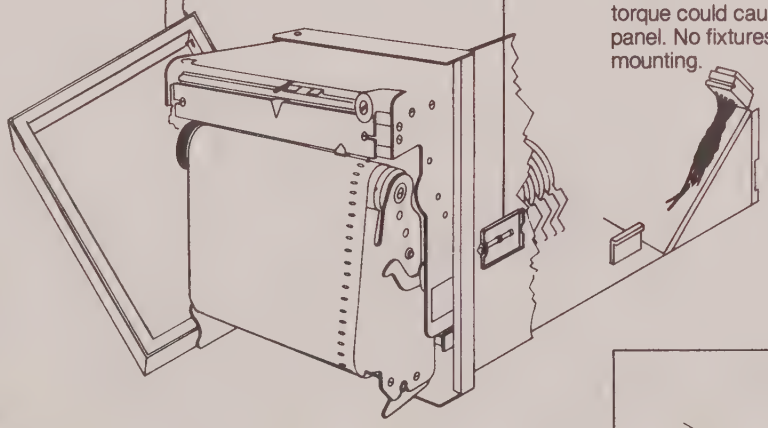
(2)
Allow sufficient clearance at rear of instrument for access to all external electrical connections.

(3)
Allow sufficient room to permit full extension and removal of chassis, as well as some clearance on both sides of open door.

(4)
Withdraw chassis to service stop and remove knockouts from sides of case.

(5)
Assemble bracket to case using hardware supplied with every instrument.

(6)
Support instrument and hand tighten screws, then use screwdriver to tighten ONE ADDITIONAL TURN. Excessive torque could cause distortion of case or panel. No fixtures are required for bench mounting.



***3.** Remove Chassis*

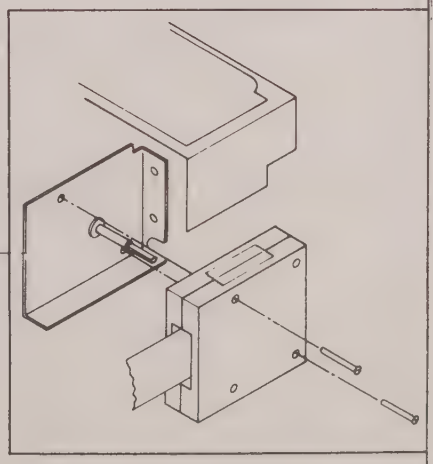
(1)
Lift release latch, grasp platen and slide chassis forward. Release latch to lock chassis in extended position.

(2)
Disconnect terminal block on drawbridge using a knurled jack screw.

(3)
Disconnect selector switch:
Remove two screws – Upper rear and lower front.
Pull switch from D-shaped hub.

(4)
Release latch and slide chassis out.

(5)
To replace chassis reverse above procedure.*



*Make sure when returning selector switch base containing rotor and wiper assembly onto D-shaped rotor shaft that base assembly is fully scaled over hub. Rotor and wipers will be aligned properly. "D" plate must float free on "D" shaft.

Figure 1

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Electrical Connections

An external wiring diagram for the instrument (30703533–000) in rear of manual shows external connections to the power connection panel (TB-1) and the input connection panel (TB-3) mounted in a compartment in the rear of the case (Figure 2). Knockouts are located around the terminal compartment to provide access.

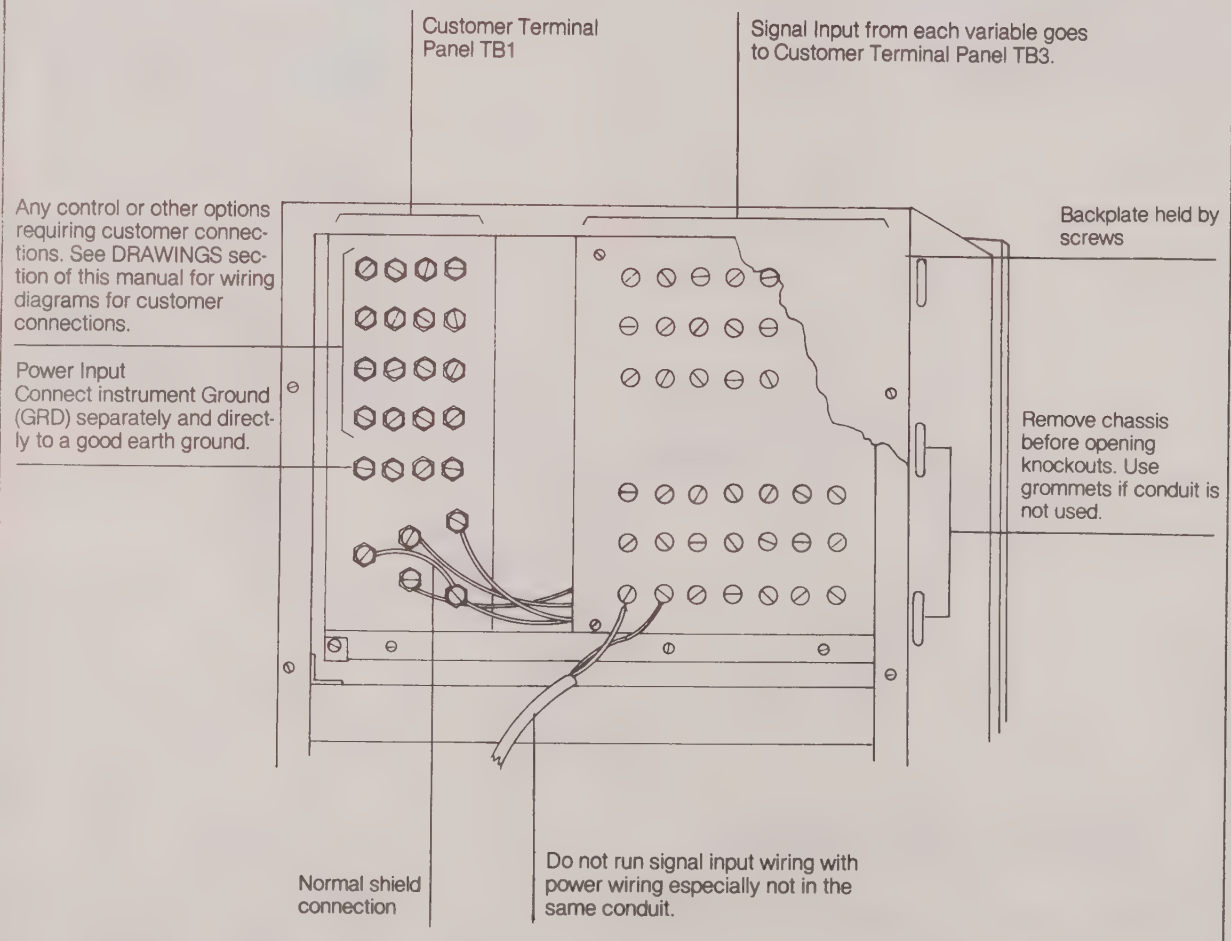

Customer Terminal Panel TB1
Signal Input from each variable goes to Customer Terminal Panel TB3.
Any control or other options requiring customer connections. See DRAWINGS section of this manual for wiring diagrams for customer connections.
Backplate held by screws
Power Input
Connect instrument Ground (GRD) separately and directly to a good earth ground.
Remove chassis before opening knockouts. Use grommets if conduit is not used.
Normal shield connection
Do not run signal input wiring with power wiring especially not in the same conduit.

Figure 2

Shield Installation

Object

The object of shield installation is to cause as little stray as possible to flow through the source resistance. The best way to reduce the effect of stray is to have as low source resistance as possible.

Ideal Situation

Types of Interference Stray

Normal mode

- Appears as a voltage between or in series with the input terminals (Figure 4).
- It is also called differential mode, transverse, series, and loop.
- The signal is attenuated by amplifier input filter.

Common mode

- Appears as a voltage between input terminals and ground (Figure 5).
- It is also called longitudinal (or stray-to-ground).
- If signal can't be rejected as shown in ideal situation, use shield jumper supplied on the input terminal panel (TB3) to minimize the conversion of common mode to normal mode.

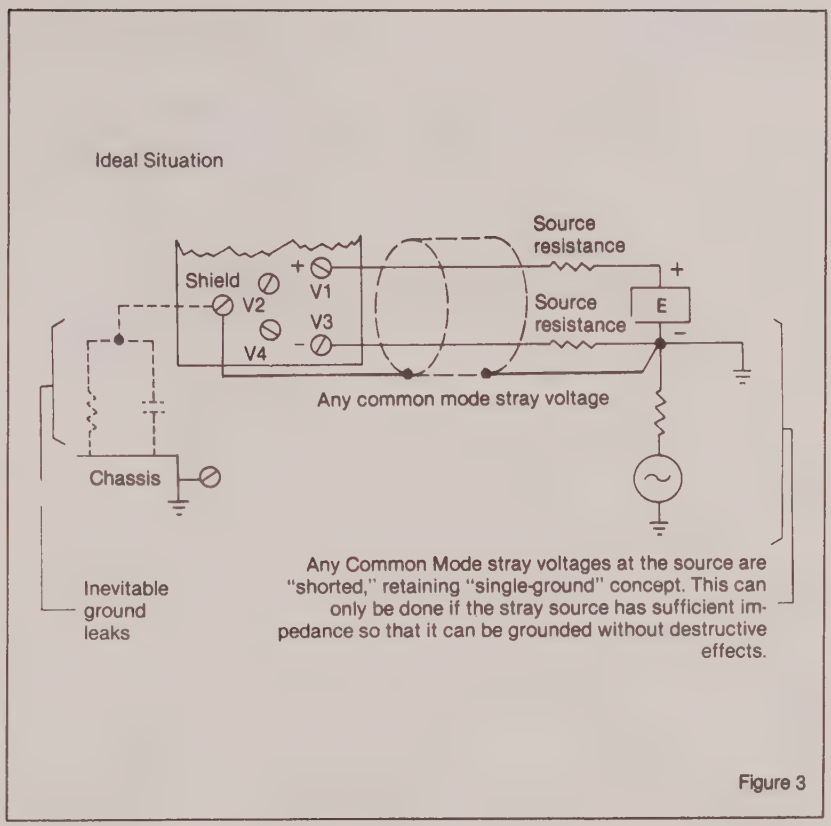

Ideal Situation
Source resistance
Shield
V2
V1
V3
V4
Source resistance
E
Any common mode stray voltage
Chassis
Inevitable ground leaks
Any Common Mode stray voltages at the source are "shorted," retaining "single-ground" concept. This can only be done if the stray source has sufficient impedance so that it can be grounded without destructive effects.

Figure 3

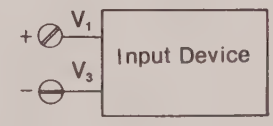


Figure 4

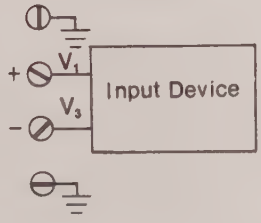
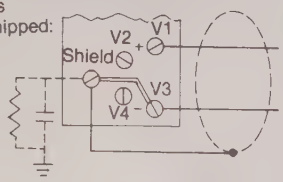
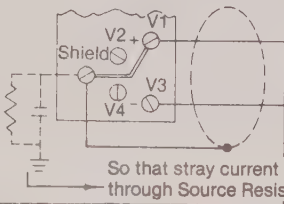
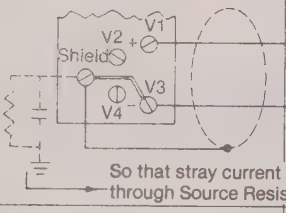
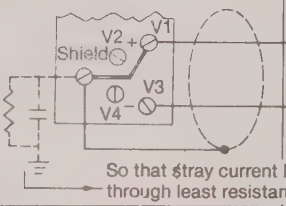
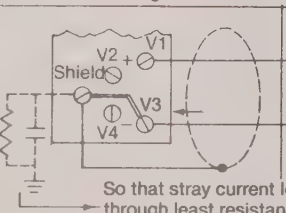
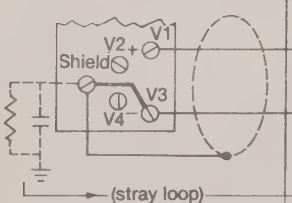
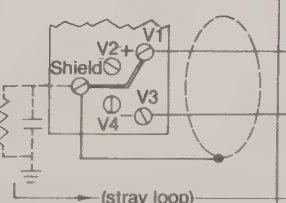


Figure 5

Connections

Connection Required	For These Conditions
As shipped: 	Wherever source impedance or resistance is less than 200 Ω, stray current will not affect instrument accuracy ratings. Above 200 Ω, accuracy ratings are affected but can be minimized as shown in conditions below.
	Stray enters positive side of source. Source Resistance E Source Voltage Any stray Voltage So that stray current loop is not through Source Resistance
	Stray enters negative side of source Source Resistance E Source Voltage Any stray voltage So that stray current loop is not through Source Resistance
	Stray enters between resistances High Source Resistance Low Source Resistance E Source voltage Any stray Voltage So that stray current loop is through least resistance
	Stray enters between resistances Low Source Resistance High Source Resistance E Source Voltage Any stray voltage So that stray current loop is through least resistance
	a-c stray enters between equal "resistances" Resistance A approximately equals Resistance B E Source Voltage A B a-c Stray Voltage
	d-c stray enters between equal "resistances" Resistance A approximately equals Resistance B E Source Voltage A B d-c Stray Voltage
Try both, connect to the terminal that gives best results.	Unknown

Considerations

1. An instrument input signal comes through the input selector switch from the input terminal panel TB3 (Figure 6).
2. The dc stray is more critical than ac, especially in high temperature and high humidity ambients.
3. Any stray voltage generated by dc leakage through the signal source will be algebraically added to the input signal.
4. Although this instrument has a floating shield, inevitable ground leaks complete a ground-loop.
5. Do not confuse "instrument ground" (GRD) which ties the chassis to an earth connection (water-pipe-ground or earth-ground) with "signal ground". We are defining signal ground as "shield" and it should be floating fully insulated from "earth ground". Shield is grounded only in ***ideal situations,*** where common mode source can be grounded without adverse effects.

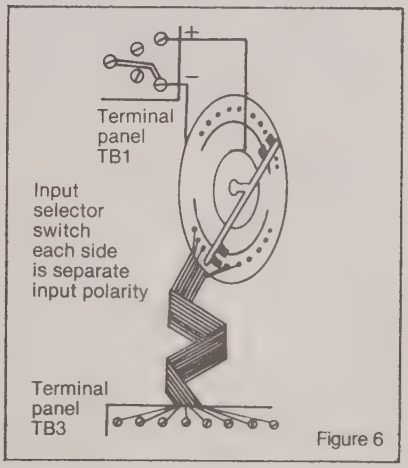


Figure 6

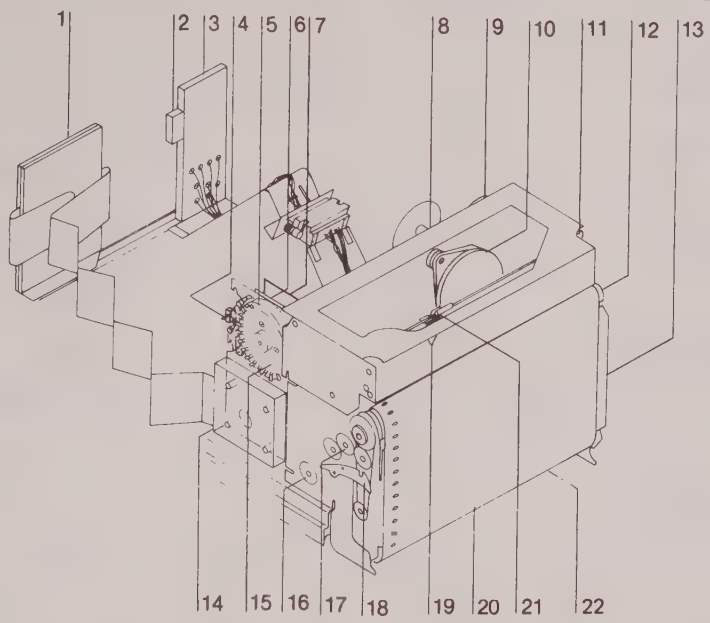
Extreme Problems

1. DC Stray
   Keep instrument ambient temperature down and atmosphere dry, free of moisture, steam, and condensation.
2. AC Stray
   When shield terminal cannot be used effectively as shown above, try a capacitor across input terminals when there is source resistance to short-circuit ac normal mode. A pair of back to back Tantalum capacitors are preferred by some. Experiments can be made with filter circuits at the input terminals using values in relation to the actual input signal and the magnitude of stray voltage.

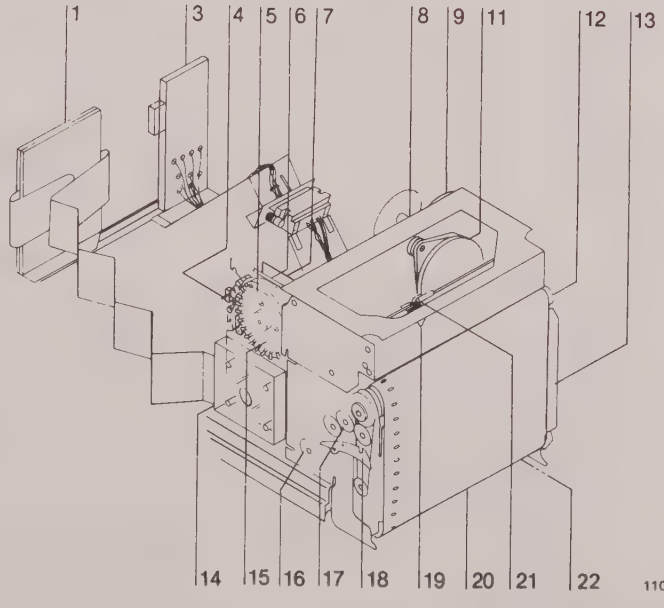
Remember that any components added to the input will affect the dynamics of the servo, generally slowing the balancing speed.

Location of Functional Parts

Model 112



Model 111



LEGEND

1. Input Terminal Panel
2. 220/240 Vac Power Transformer
3. Power Terminal Panel
4. Internal Hold Switch
5. Select-O-Print Actuating Arm
6. Multipoint Electronics for Accelerated Select-O-Print
7. Select-O-Range Wheel
8. Backset Switches and Transmitting Slidewires
9. Frontset Contact Control Switches
10. Servo Bull Gear and Slidewire
11. Front Set Knob
12. Chart Advance Knob
13. Chart Transport (recording position)
14. Input Selector Switch
15. Select-O-Print Wheel
16. Chart Speed Change Gears
17. Chart Drive Gears
18. Chart Transport Latch
19. Frontset Control Pointer
20. Chart
21. Print Carriage with Select-O-Trend Activating Toggle
22. Amplifier, Power Transformer, Constant Voltage Unit and Measuring Circuit Mounted under Chassis

Figure 1

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Startup

Warm Up Time

Switch on instrument power and allow instrument to warm up for at least 30 minutes to stabilize internal temperature and insure measurements obtained are within calibrated accuracy of instrument.

Electrical Adjustments and Switches

1. Power On-Off Switch

This switch is mounted on front right of chassis, under chart transport. 120 Vac is furnished to power interconnecting block (J2) through this switch. This switch can be omitted if desired.

Power switch on with chart switch off allows unit to operate as an indicator on only one point.

2. Chart Drive Switch

MODEL 111

This switch is mounted next to power switch on chassis. The switch starts chart and multipoint drive. If accelerated Select-O-Print is present, switch starts chart only (Figure 3).

MODEL 112

This switch is mounted on the center front of the chassis. The switch starts chart and multipoint drive. If accelerated Select-O-Print is present, switch starts chart only (Figure 4).

3. Span

Span adjustment provides a means of changing span up to 10% full scale.

Clockwise will decrease.

Counterclockwise will increase.

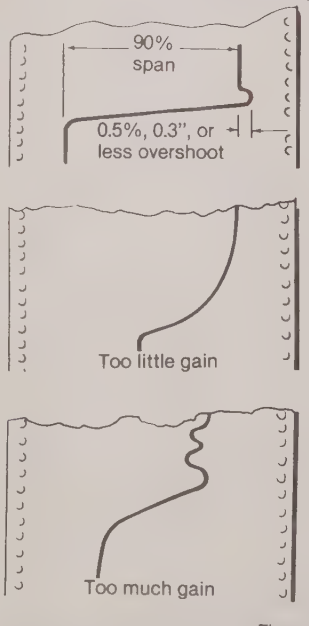


Figure 2

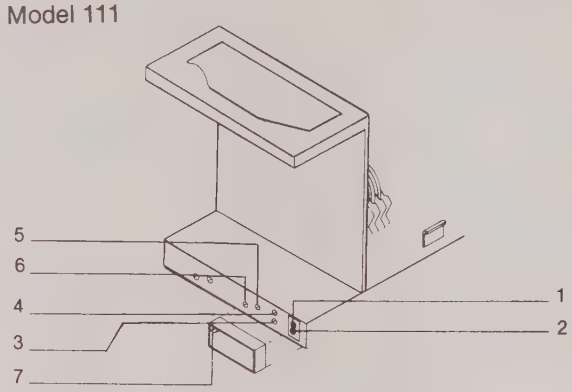


Figure 3

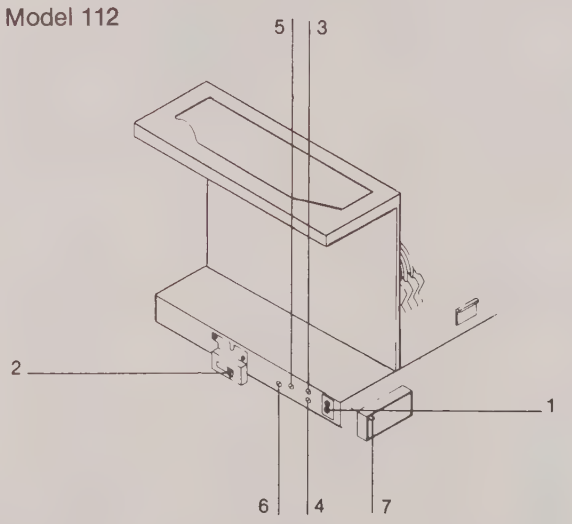


Figure 4

4. Zero

Zero adjustment produces linear shift of all points on instrument scale without changing span.

Clockwise will shift points downscale.

Counterclockwise will shift all points upscale (to the right).

If the instrument has reverse actuation, clockwise will shift all points upscale (to the left), etc.

5. Damping

Damping adjustment is used on instruments with 1 second servo speed and/or spans of less than 5 millivolt to match response speed of the process dynamics.

Clockwise reduces (dampens) overshoot, decreases response.

Counterclockwise reduces damping, increases response.

6. Gain

Gain adjustment changes sensitivity to those input signals which are greater than 0.1% of full scale.

Clockwise increases sensitivity.

Counterclockwise decreases sensitivity.

Optimum gain setting should give minimum or no overshoot (0.5% or less) on a 90% full scale step change (Figure 2).

If deadband exceeds 0.1% increase gain. Deadband should not be adjusted below 0.1%, since it may increase the instrument's susceptibility to electrical noise signals. (Refer to calibration section 412-44.)

7. Hi-Lo Gain Jumper

Position of gain jumper depends upon instrument span. In general, it should be connected to Hi gain pin for an instrument span of less than 15 millivolts, and to Lo-gain pin for spans of more than 15 millivolts.

Sequence of Events (Figure 5)

1. Input signals enter recorder through input terminal in rear of case.
2. Selector switch position determines which input passes through to the measuring circuit where it is compared with signal from slidewire.
3. The difference is sent to amplifier where it is converted to ac voltage, amplified and used to drive the servo motor.
4. The servo motor drives wiper on slidewire until difference is eliminated. Also through drive cable, it carries the print carriage assembly to a balance point on scale.
5. A servo disable switch is actuated to stop the servo drive either electrically or by a cam driven by the print motor drive assembly.
6. The print head drive assembly drives the orbiting rod causing an arm pivoted on print carriage assembly to rotate.
7. Two wheels, one with dots and one with numbers, are pressed against chart and lifted during balancing.
8. A twelve segment wheel holding 12 ink pads is mounted on the print head.
9. A 12 or 24 toothed rachet wheel driven by a pawl on print head is geared to the dot, number and ink pad wheels. The three wheels are advanced with each cycle.
10. A toggle on the carriage permits choice of printing an identifying number beside each dot or alongside every thirteenth dot only (Select-O-Trend).
11. Select-O-Print recording option permits selection of inputs to be recorded.
12. Accelerated Select-O-Print option increases input skip rate to 0.5 second per input, permits selection of one of five print rates, and permits stopping printing at any selected input.

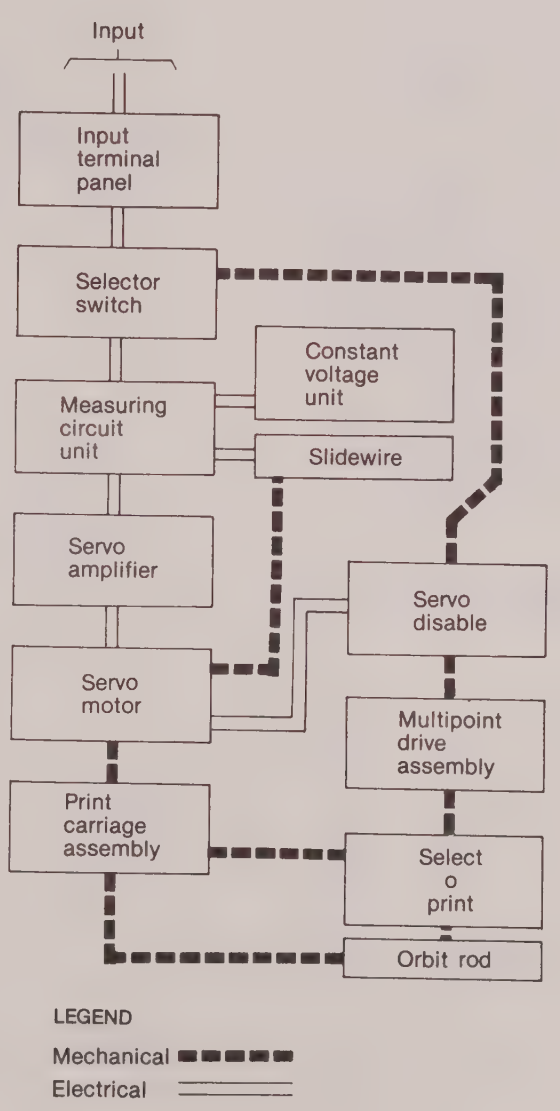


Figure 5

Selectable Features

Select-O-Trend Recording

Normal printing will have an identifying number printed beside each dot. If record appears too cluttered, activate Select-O-Trend function to have a number printed beside every thirteenth dot only.

A two-position toggle (Figure 6) provides Select-O-Trend printing of records.

When toggle is forward, it will print appropriate record number for each record dot.

When toggle is to the rear it will print appropriate record number for every 13th "dot only" record.

EXAMPLE: On a six record instrument that has just printed numeral 4 while in Select-O-Trend mode, record 4 will be printed as only a dot 2 times before numeral 5 is printed. Record 4 will be printed as only a dot a total of 12 times before the numeral 4 is repeated.

NOTE: It does not matter if you have a 2, 3, 4, 6, 12 or 24 record instrument when in Select-O-Trend mode. The same record numeral will print every thirteenth time that record is selected on input selector switch (Figure 7).

CAUTION:
Do not operate print drive mechanism in reverse. This will damage instrument.

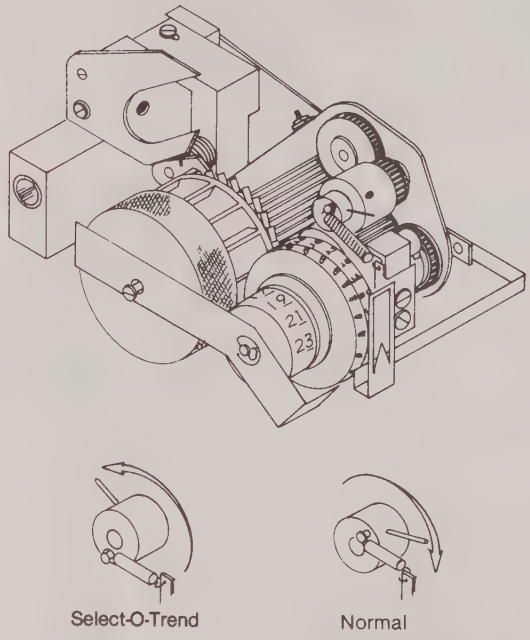


Figure 6

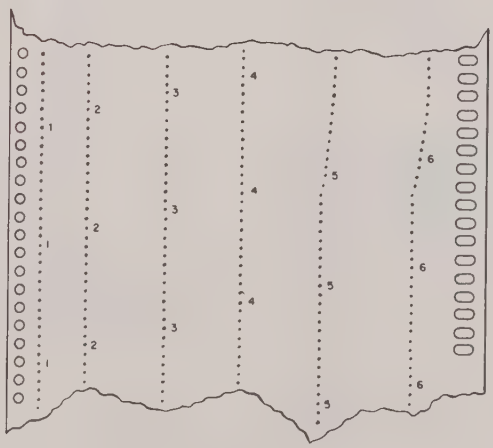


Figure 7

Contact Control

Adjustment of Frontset Index
Set point (point of actuation for contacts) can be adjusted by knob on upper right corner of chassis (and door, if this option has been specified). Index pointer on the scale shows position of setting in relation to instrument span.

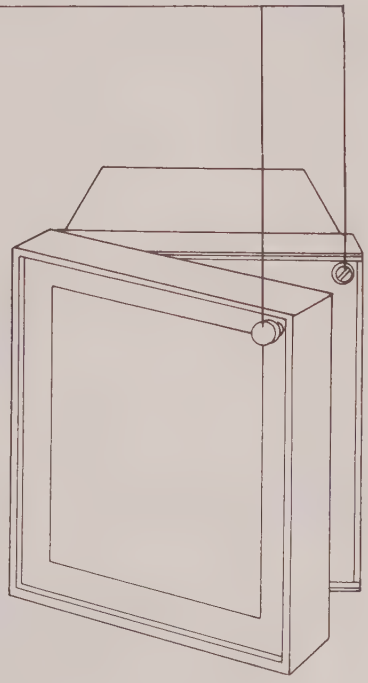
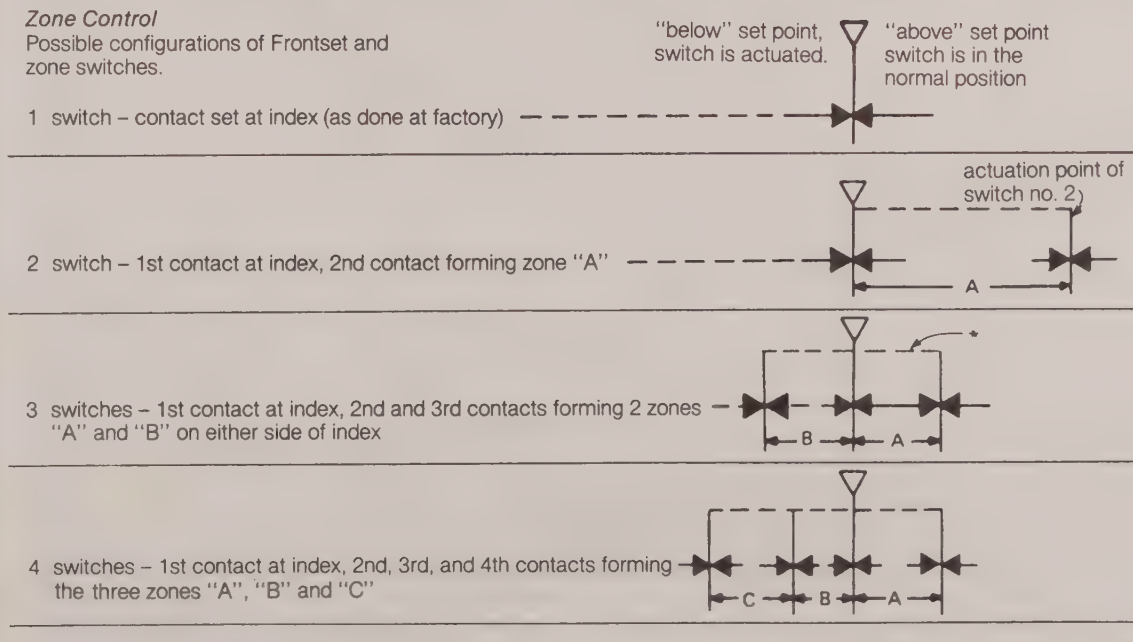


Figure 8

Zone Control
Possible configurations of Frontset and zone switches.


"below" set point, switch is actuated.
"above" set point switch is in the normal position
1 switch – contact set at index (as done at factory)
actuation point of switch no. 2
2 switch – 1st contact at index, 2nd contact forming zone "A"
A
3 switches – 1st contact at index, 2nd and 3rd contacts forming 2 zones "A" and "B" on either side of index
*
B
A
4 switches – 1st contact at index, 2nd, 3rd, and 4th contacts forming the three zones "A", "B" and "C"
C
B
A

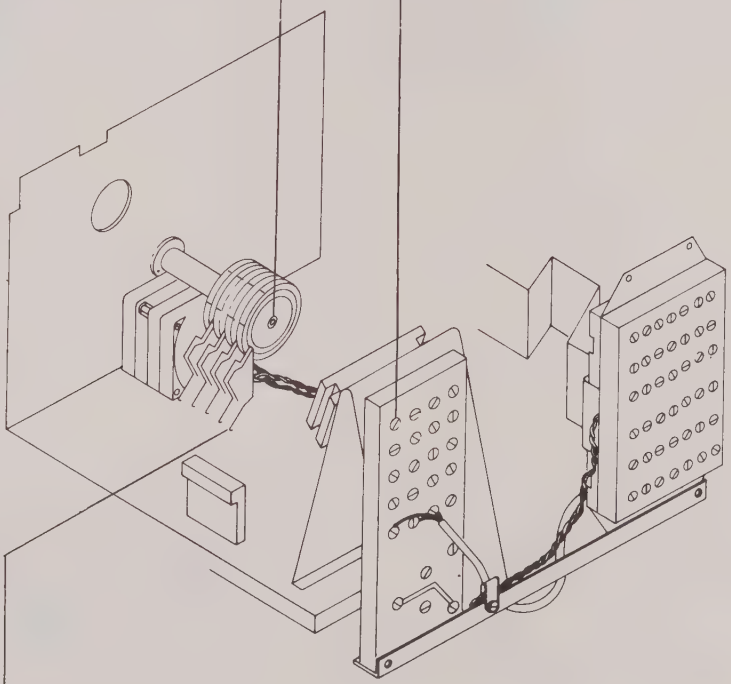
**"Zones" are tied together mechanically by differential gear shaft to set point.*

Figure 9

Adjustment of Zone Switches

1
Set zones by loosening thumbnut just enough to allow cam to be rotated on differential gear shaft. Slots are provided on cam circumference to place screwdriver blade as an aid in their positioning. Tighten thumbnut to hold cams in position selected.

2
In locating point of switch actuation, instrument should not be connected into a process, but rather connect a multimeter across appropriate terminals. Determine terminals from diagram for customer terminal connections, located in drawings section of this manual.



3
Switches are Type SM Micro Switch units, 5A, at 120 Vac. Zones (A, B and C) are factory set at 5% unless otherwise specified. Each switch may be set at maximum of ± 10% from index.

Figure 10

Adjustment of Backset Switches

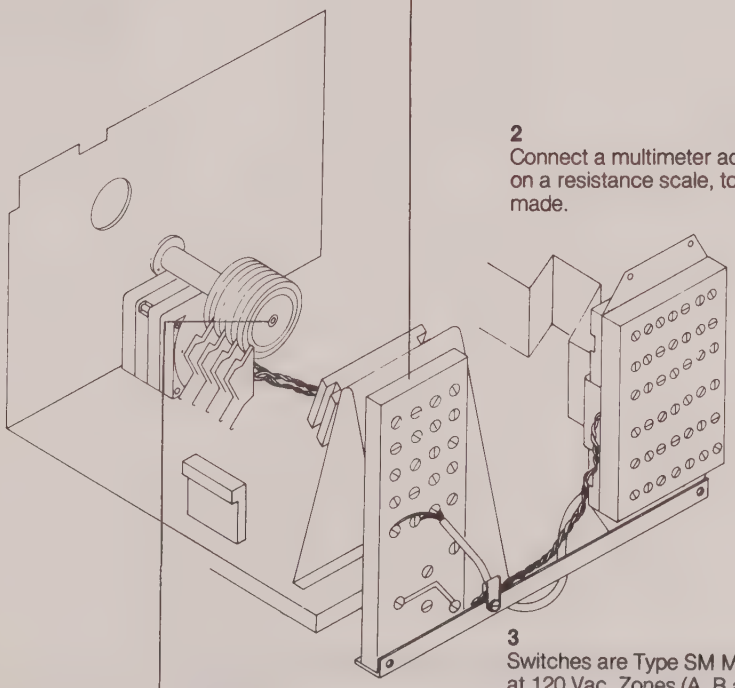
These switches are more commonly used for alarm signals, but can also be used for "blind" controlling (no index pointer to show switch actuation point).

The switch actuates when rise in cam engages switch arm.

To Set Cam

1

Disconnect any circuit from across appropriate connectors on terminal panel TB. These can be determined from diagram for CUSTOMER TERMINAL CONNECTIONS located in DRAWINGS section of this manual.



2

Connect a multimeter across these terminals and set on a resistance scale, to determine when contact is made.

3

Switches are Type SM Micro Switches, 5A, at 120 Vac. Zones (A, B and C) are factory set at 5% unless otherwise specified. Each switch may be set at maximum of ± 10% from index.

4

With a screwdriver, loosen clamp holding cam on servo shaft.

5

Rotate cam until rise actuates switch.

6

Manually rotate servo cable drum to move indicator back and forth past desired actuation point and position cam as is necessary.

7

Tighten clamp.

Figure 11

Options

Fixed Print Cycle Select-O-Print Recording (Table VII - Option 201)
With this option only those inputs desired are printed. All other inputs are skipped at a rate equal to print cycle rate of instrument. The Select-O-Print wheel is mounted on left side of chassis, over input selector switch. Activate Select-O-Print:

1
Withdraw chassis to service stop.

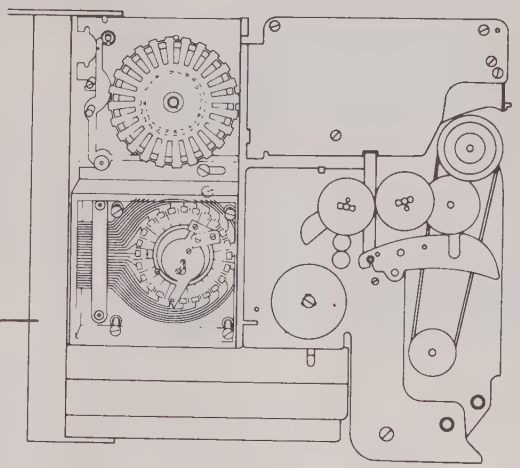


Figure 12

2
Place all buttons on periphery of wheel in up position (Figure 13).

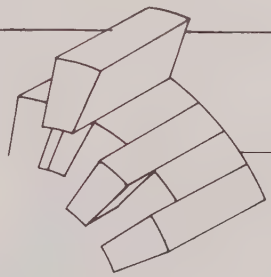


Figure 13

3
Select inputs to be skipped and push those buttons in the down position (Figure 14).

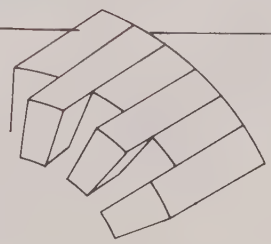


Figure 14

Select-O-Trend Printing function can still be actuated with Select-O-Print Recording.

When, after programming Select-O-Print wheel, printing of all inputs is desired, it can be done without disturbing button positions (Figure 15).

1
Move arm from position A to position B and push spring loaded pin in until it is behind mounting bracket. This will hold arm away from wheel and all points will print

2
Push arm back and pin will spring return to release arm and reactivate Select-O-Print function.

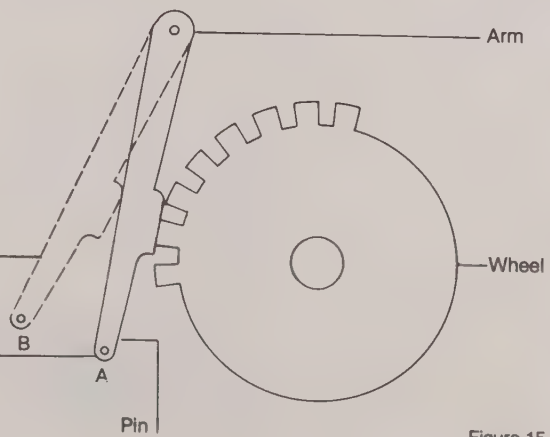


Figure 15

Accelerated Select-O-Print Recording (Table VII - Option 202)

The Select-O-Trend and Select-O-Print wheel perform the same function as described in the previous paragraph. With this option, a faster print drive motor and an electronic circuit have been added to obtain additional functions.

Input skips at 2 points per second. Switches mounted on electronic circuit board select any one of five print rates (Figure 17). This board is mounted on inside of bracket supporting Select-O-Print wheel.

Internal hold stops print action and holds servo to indicate selected input. A toggle switch mounted beside Select-O-Print wheel activates this function.

The 2 second print cycle is to be used only when a 1 second balance motor is specified (Table I XBXXX) in the model number.

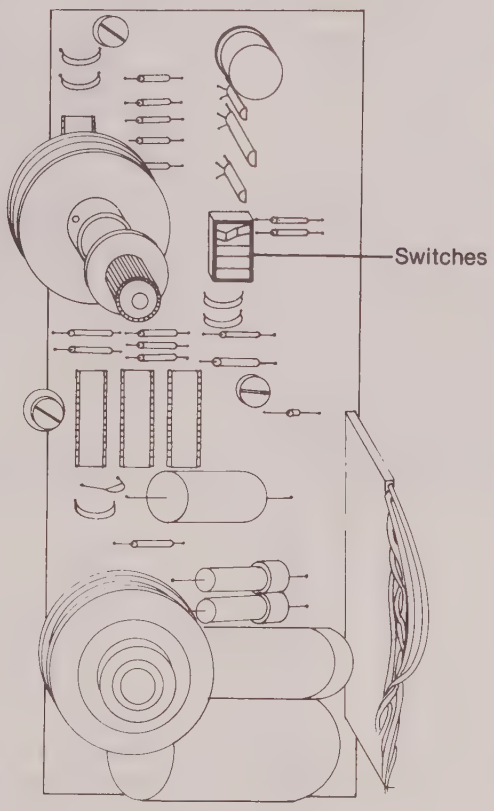


Figure 16

Accelerated Select-O-Print Switch Settings

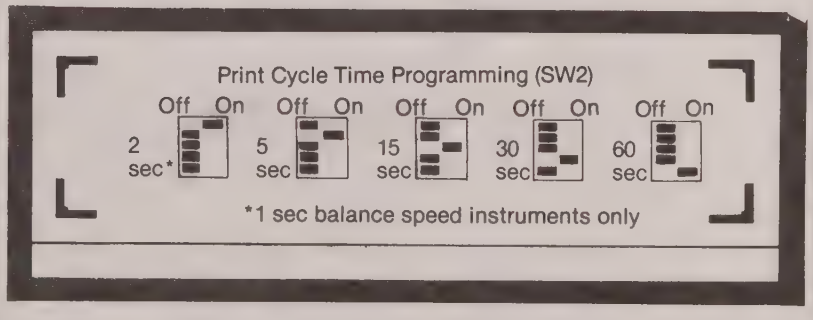


Figure 17

Dual Range
(Table VII - Option 211 and 214)

The dual range amplifier is located under the servo amplifier on the model 111 (Figure 18) or under the left side of the chassis on the model 112 (Figure 19).

This amplifier accepts two inputs simultaneously wired to a single terminal panel in the rear of the recorder. One of the amplifier's two preamplifiers converts the input signal into a voltage signal for input to the recorder's measuring circuit. The range selection depends on the position of the dual range toggle switch located on the front of the chassis (see Figures 18 and 19).

The zero and span adjustments for the dual range amplifier are also located on the front of the chassis (see Figures 18 and 19). Refer to calibration preparation section 422, in accordance with actuation, and calibration procedure section 412-44.

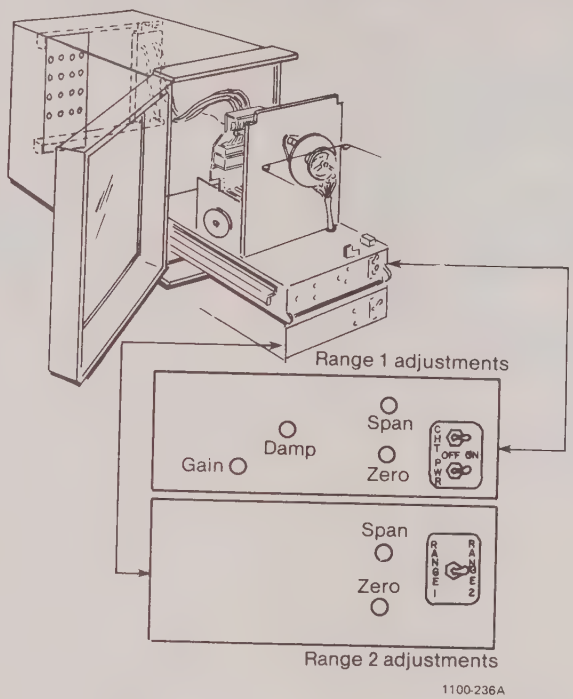


Figure 18 – Model 111

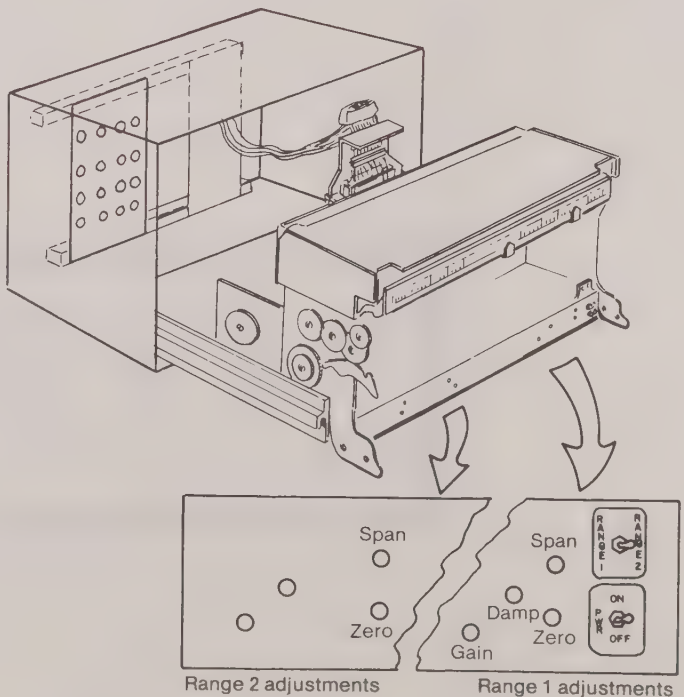


Figure 19 – Model 112

Select-O-Range
(Table VII - Option 212 and 215)

Each record is wired for one of two inputs. Range selection depends on the position of selector tabs on a rotating selector wheel located behind the selector switch on the rear of the chassis. This rotating selector wheel contains 24 pins. Each pin corresponds to a different record and its position determines the input range for that record (see Figure 20).

One of the Select-O-Range amplifier's two preamplifiers converts the input signal to a voltage signal for input to the recorder's measuring circuit.

The Select-O-Range amplifier is located under the servo amplifier on model 111 (Figure 21) or under the left side of the chassis on the model 112 (Figure 22).

The zero and span adjustments for the Select-O-Range amplifier are located on the front of the chassis (see Figures 21 and 22). Refer to calibration preparation section 422, in accordance with actuation, and calibration procedure section 412-44.

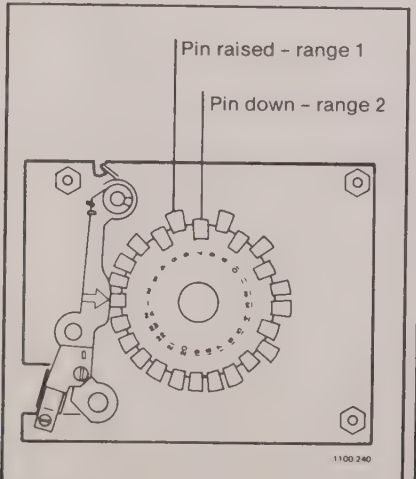


Figure 20 – Select-O-Range Wheel

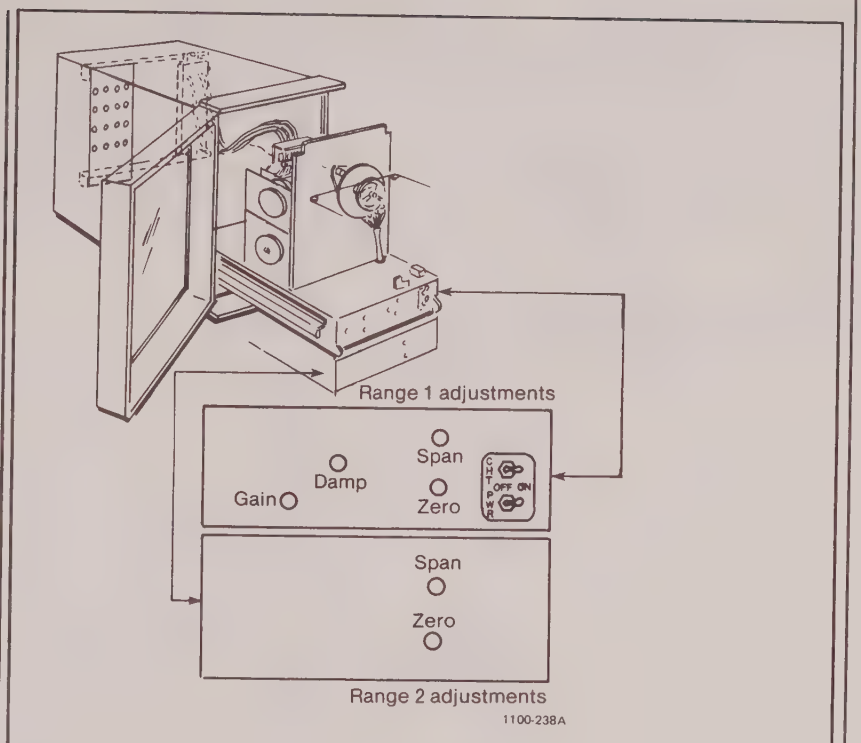


Figure 21 – Model 111

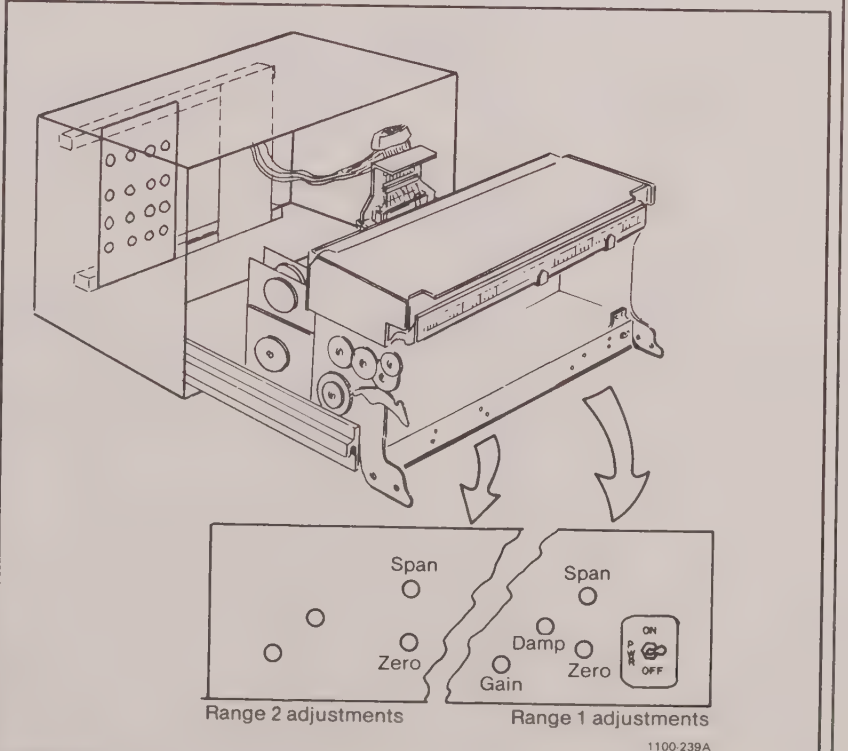


Figure 22 – Model 112

Transmitting Slidewire (Table VII – Option 501 through 528)

The transmitting slidewire is used to convey an electrical signal proportional to the servo shaft position.

The slidewire has platinum resistance wire to resist corrosion, four contacts on slider to insure positive contact, a dust cover which is an electrical shield, 2250 convolutions for high resolution, and has 0.1% linearity.

The slidewire(s) is/are available with or without adjustable end resistors, (trimpots or T/P). The slidewires (S/W) are available in 100, 500, 1000, 5000 ohm values.

TERMINAL BOARD CONNECTIONS

Servo #1

Cable	Wire Color	Terminal Connection S/W #2	T/P #2	T/P #1	S/W #1	J1 Conn.	Drawbridge Cable Tie	TB-1 Conn. Pts.
Slidewire #1	Grn/Orn				1	S	VI	D
	Grn/Pr				2	T		C
	Grn/Yel				3	X		E
Slidewire #1 with Trimpots	Grn/Orn			3		S	VI	D
	Yel/Grn			2		R		H
	Grn/Pr				2	T		C
	Blu/Red		2			W		F
	Grn/Yel		3			X		E
	Pr			1	1			
	Blu		1		3			
Slidewire #2	Grn/Orn	1				b	VI	J
	Grn/Pr	2				r		K
	Grn/Yel	3				w		L

Servo #2

Cable	Wire Color	Terminal Connection S/W #4	T/P #2	T/P #1	S/W #3	J1 Conn.	Drawbridge Cable Tie	TB-2 Conn. Pts.
Slidewire #3	Grn/Orn				1	F	II	D
	Grn/Pr				2	H		C
	Grn/Yel				3	L		E
Slidewire #3 with Trimpots	Grn/Orn			3		F	II	D
	Yel/Grn			2		E		H
	Grn/Pr				2	H		C
	Blu/Red		2			M		F
	Grn/Yel		3			L		E
	Pr			1	1			
	Blu		1		3			
Slidewire #4	Grn/Orn	1				N	II	J
	Grn/Pr	2				P		K
	Grn/Yel	3				V		L

Various possible component locations on #1 servo shaft

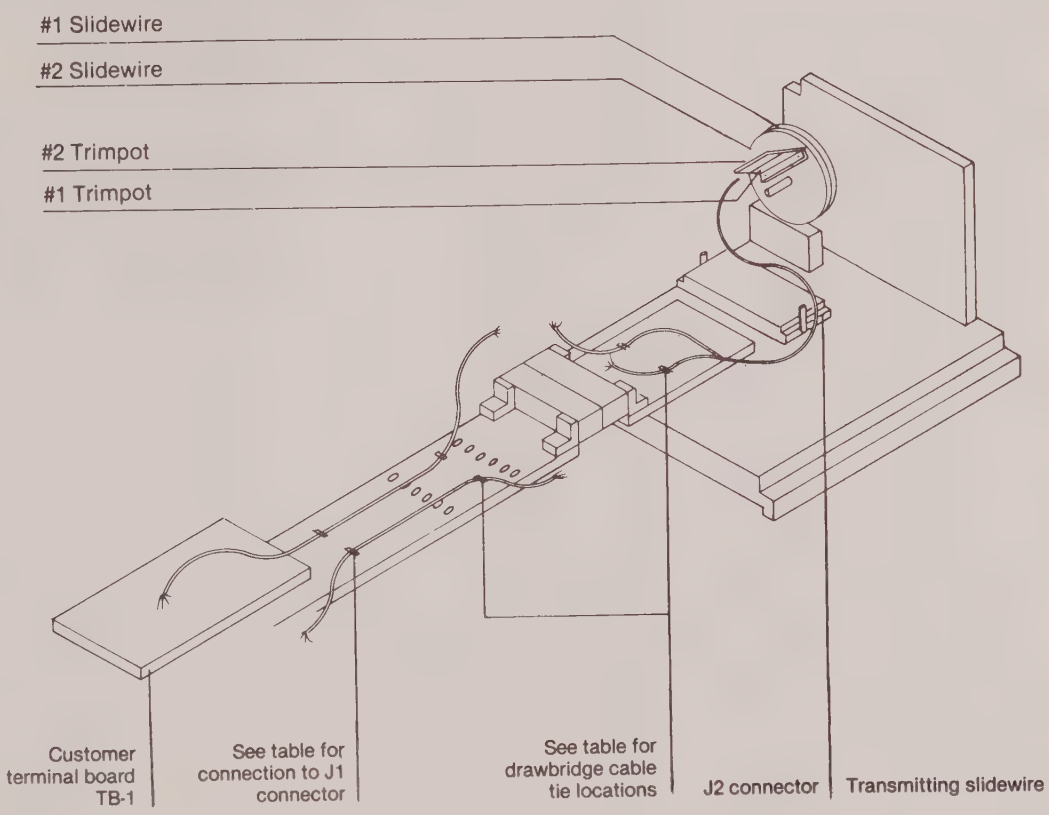


Figure 23

Fluorescent Illumination (Table VII - Option 002)

Multipoint 111
An added feature to this instrument is fluorescent illumination.
Any time power to recorder is switched off and back on, lower the chart transport and push red momentary switch button mounted to bracket on front of chassis. Hold until lamp is lit.

Multipoint 112
An added feature to this instrument is fluorescent illumination.
Any time power to recorder is switched off, lamp is automatically relit when power switch is actuated.

Process Multipoint Recorder Model 111, 112

Maintenance

Introduction

Adherence to a routine inspection and maintenance program will insure optimum instrument performance and should reduce servicing requirements to a minimum. The checks and maintenance procedures included in this section are recommended to supplement normal industrial preventive maintenance and inspection procedures. The frequency of periodic maintenance is based on instrument operating time and print cycle time. For example, an instrument with a 2 second print cycle time may require more frequent maintenance than one with a 15 second print cycle time for the same number of operating hours. For continued satisfactory performance, establish a regular maintenance schedule in accordance with the instrument operating cycle. Include in the maintenance schedule the inspection of items such as relays, Micro Switch unit, and any gears or other moving parts.

Routine checks are tabulated in this section. Some procedures are given, others are cross-referenced to other sections of this manual.

Cleaning

Caution on Cleaning Solvents

There are many polycarbon components used in this instrument because of their durability and ability to hold precise tolerances over a long life. The material also does not contaminate electrical contacts, etc, making it invaluable as supporting members around electrical and electronic components.

To protect these components DO NOT USE CHLORINATED SOLVENTS IN CLEANING. If such a solvent should splash onto these components, it will make them brittle and easily damaged. Therefore do not use anywhere inside the instrument such solvents as carbon tetrachloride, trichloroethane, and Freon-TMC (an azeotrope of Freon-TF and methylene chloride). When a solvent is needed at all, use Freon-TF (trichlorotrifluorethane).

Indicating Scale

Use a soft cloth with a soap and water solution to remove dirt, grease, and ink. Do not use alcohol-based solvents which may attack the lacquer finish of the scale.

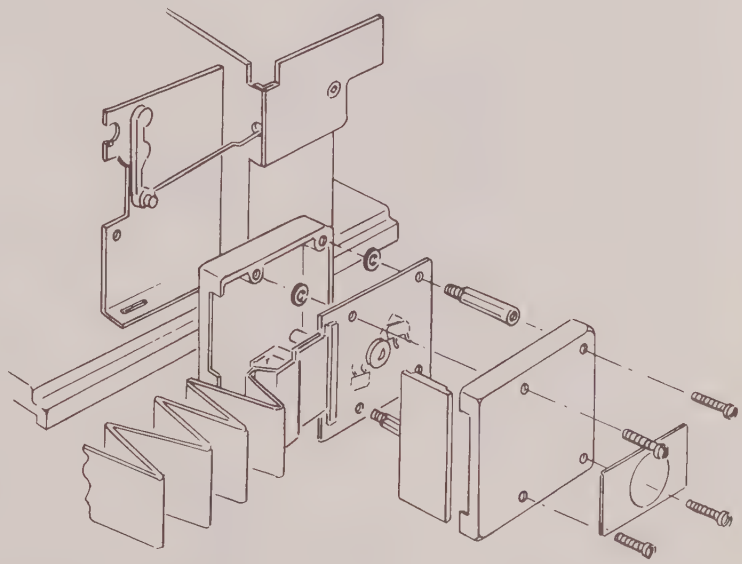


Figure1

Chart Drive Gears

Use a stiff bristled brush and recommended solvent.

Print Wheel

Every 6 months, or as required clean print wheel of lint, dust, etc. Use a stiff bristled brush.

Selector Switch

Every 6 months visually inspect contacts through the clear plastic dust cover for alignment of pads, dirty contacts, or severe wear.

To gain access to the selector switch board, disassemble as shown in Figure 1.

When reassembling, visually center the selector switch board with the hub, insuring that the contacts align properly with the pads throughout the entire revolution.

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Rebalancing Element and Wiper Arm Assembly Maintenance

Wiper Arm Assembly

The arm consists of a contact wiper and collector coil. The four-fingered contact is gold alloy and is fused to the end of contact arm. The spiral collector coil provides an electrical connection between the wiper contact and collector terminal.

CAUTION: The collector coil and the four fingered contact on the wiper arm assembly are fragile and can easily be disfigured. Handle with care.

Conductive Plastic Slidewire

Conductive plastic is a hard, wear resistant, chemically inert plastic track bonded to an insulator base. It is more precise (better resolution) than a wirewound slidewire and generates less noise. The large cross sectional area of conductive plastic will not develop opens or shorts. It requires little or no maintenance.

CAUTION: Guard against excessive wiper current during installation or removal of slidewire. Current in excess of 10 milliamperes will destroy the conductivity of plastic strip. A (V.O.M.) volt ohmmeter is used during the installation procedure. If you are not sure of current draw of your meter, place a current reading meter in series with the V.O.M. Move selector switch through various resistance ranges to determine the short circuit current of each range and use the range that draws less than 10 milliamperes of current.

Testing Precautions

1

Never apply a voltage to the wiper terminal.

- "Ohmmeters" built into hand set volt-ohmmeters, when used on the lowest scale, apply a voltage without current limitation and must not be used to locate taps or end points.
- In connecting the potentiometer, first be sure to identify the wiper terminal or lead, and connect it only to high impedance measuring circuits.
- Guard against shorting the wiper to an end terminal. If the end terminal is energized, the wiper will also be energized. Extreme care should be exercised to avoid accidental shorts when using alligator clips.

2

Guard against excessive wiper current in the test circuit.

- A capacitor between the wiper and any part of the power source acts as a dead short to an instantaneous change in voltage. Such a surge can occur when continuity between the wiper and resistance element is broken, or when a power switch is thrown.
- Some load impedances change sharply. A lamp should not be used for checking continuity. For instance a 1 watt 110V incandescent bulb draws a large multiple of its nominal 9 mA when it is first energized.

3

Check permissible maximum excitation voltage on the end terminals, considering not only the track resistance and power rating, but also the added effect of load current.

4

Guard against internal arcing caused by:

- Discharging of capacitors.
- Surges due to inductive loads.
- Constant current supplies with high open circuit voltage.

5

When testing linearity or conformity, be sure to mount the potentiometer so that no significant mechanical eccentricity errors are introducted into the shaft position measurement.

6

When measuring output, use a nulling method or a ratiometer whenever possible. A voltmeter may act as a significant load and may affect the output reading.

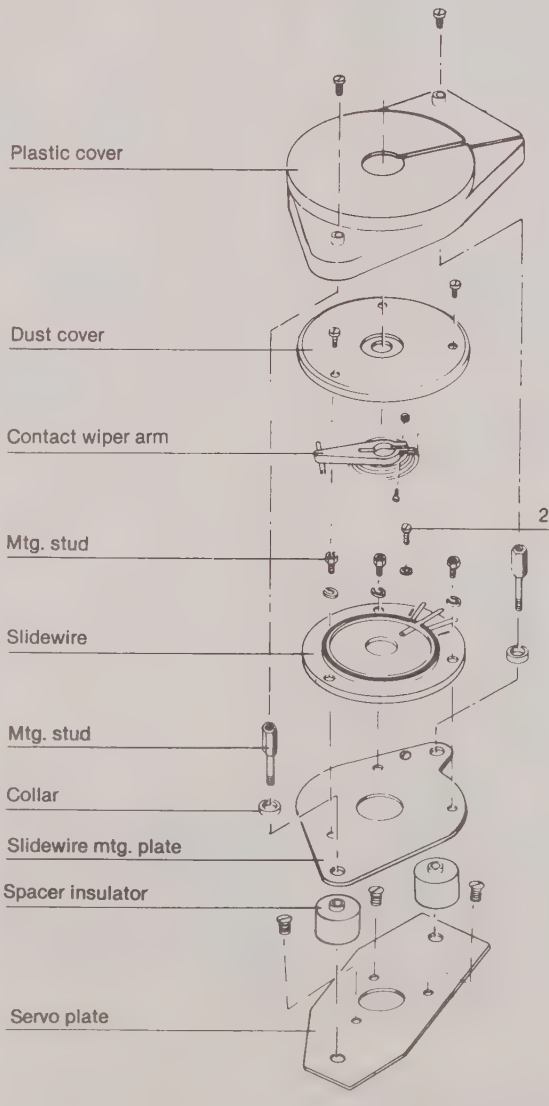


Figure 2

Cleaning

Under normal operating conditions, the slidewire or plastic strip does not require any maintenance. However, if instrument doesn't operate properly and a dirty slidewire or plastic strip is suspected, proceed as follows:

Rebalancing Element Disassembly

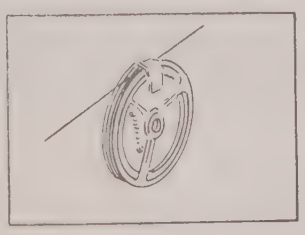
1
Disconnect all power to instrument.

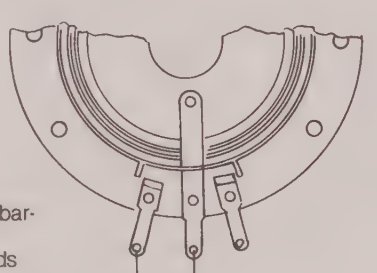
2
Release chassis latch, pull out chassis, remove chart transport and remove or lift up top cover of chassis.

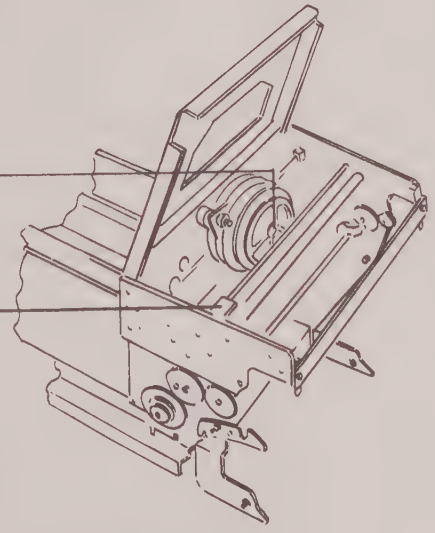
3
Rotate bull gear until cable drum set screw is topside. Loosen set screw.

4
Move bull gear fully clockwise so that carriage fastening point on drive cable is at extreme left of scale.

5
Apply strips of masking tape over top of cable drum groove and down cable drum sides to hold cable in place. Slide cable drum off servo shaft and move drum to left out of way.







6
Remove plastic cover (common mode barrier) and dust cover from slidewire. Remove red, white and black input leads from connector terminals by pulling on lead wire lugs. DO NOT PULL ON LEAD WIRES. Disconnect blue wire from mounting plate.

7
Refer to warning at beginning of this section regarding plastic slidewires. Connect one ohmmeter lead to collector terminal of slidewire and one lead to terminal designated as zero percent of range span.

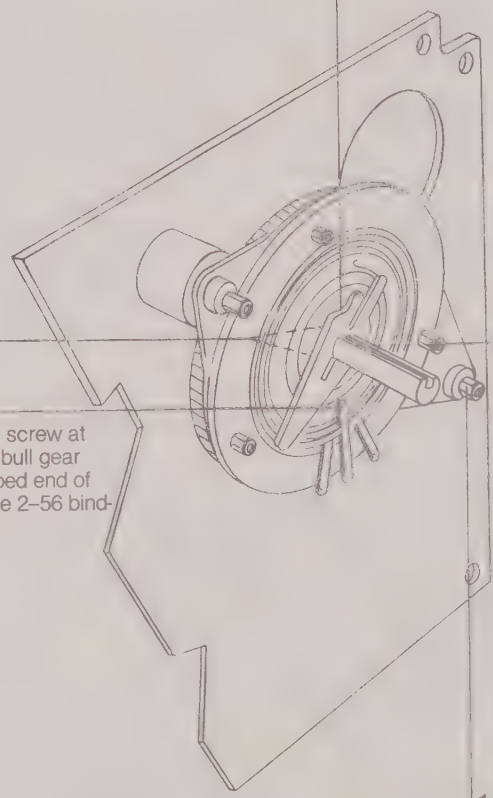
8
Turn bull gear through its full travel from stop to stop. Ohmmeter will fluctuate at dirty spots and even show an open circuit.

9
It is not necessary to remove slidewire to clean it but, if you wish to do so, proceed as follows:

Figure 3

10
Turn bull gear so contactor on wiper arm is at 10 o'clock on face of slidewire element.

12
Loosen the capscrew that locks wiper arm to servo shaft with bristo wrench 30360711-001. Place small screwdriver between top of wiper arm and inner part of plastic base of element. Pry wiper arm away from plastic base of slidewire as far as you can with a small screwdriver. Grasp wiper arm with hand and pull it off servo shaft.



13
Disconnect 3 hex head mounting studs and remove slidewire element from mounting plate.

11
Loosen the 2-56 binding head screw at top of collector terminal. Turn bull gear counterclockwise and the looped end of wiper arm coil will move off the 2-56 binding head screw entirely.

14
Remove remaining 2 hex head studs, collars, spacers and the slidewire mounting plate.

Figure 4

Wiper Arm Assembly

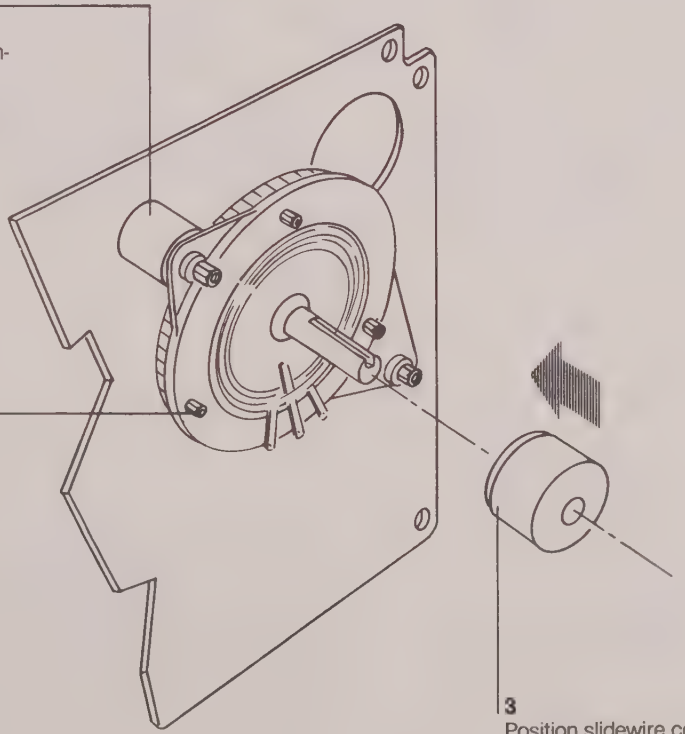
CAUTION:
The collector coil and four fingered contact on the wiper arm assembly are delicate and easily disfigured components of servo rebalancing circuit. Handle with care.

1. Do not lift the wiper contact by hand. Bent wiper fingers will result in poor contact between wiper and plastic strip.
2. Clean the wiper by placing a piece of bond paper between wiper contact and plastic strip and turning the bull gear back and forth.

Conductive Plastic Slidewire Cleaning

Clean the conductive plastic element with alcohol or Freon-TF. DO NOT use any chlorinated solvents such as Chlorothene-Nu or Freon-TMC. Apply alcohol with a commercial applicator such as a mini-wipe, or use a lint free cloth. Air dry element.

Reassemble Balancing Element



1
Attach the plastic spacers and collars to slidewire mounting plate, and fasten to instrument chassis with three small hex head studs and lockwashers. Tighten studs.

2
Affix slidewire element to mounting plate with three small hex head studs and lockwashers, semi-tight.

3
Position slidewire centering tool on the servo drive shaft, bevelled end toward slidewire. Slide tool along shaft and up against center of slidewire assembly. The bevelled nub will center slidewire.

4
Tighten three mounting studs and remove centering tool.

Figure 5

Installing Contact Wiper Arm

1
Rotate servo drive shaft counterclockwise until bull gear hits the stop.

2
Loosen the 2–56 binding head screw on slidewire collector terminal. Push wiper arm assembly on servo shaft (collector coil side first) so wiper arm is positioned at 7 o'clock, close to, but not on the conductive element.

3
Position wiper close enough to allow collector coil to be connected to collector terminal and yet not allow wiper to make contact with conductive element. Turn bull gear in clockwise direction until the looped end of collector terminal and yet not allow wiper to make contact with conductive element. Turn bull gear in clockwise direction until the looped end of collector coil comes to a stop against the 2–56 screw on terminal collector. Tighten the 2–56 binding head screw while holding collector spring against center section of slidewire with your left thumb. This will prevent distorting collector coil. The coil should not touch servo shaft.

4
Turn bull gear in clockwise direction against the zero stop.

5
With conductive plastic slidewire, align contact wiper with index mark at "A" or "B" on slidewire moulding. (At "A" for standard range; at "B" for reverse range.)

6
At this point, take wiper contact (pressure) adjusting tool 30679100–001 and turn knurled knob tight against locking end of tool. Then back it off one full turn.

7
Push adjusting tool on servo shaft close to, but not on wiper arm. Tighten the two clamp screws.

8
Connect one ohmmeter lead to collector terminal and one lead to either of other terminals (marked "A" & "B").

9
Turn knurled knob of brass adjusting tool clockwise until contact with slidewire is indicated on ohmmeter.

10
Push knurled knob forward to its stop. This sets wiper deflection to 0.025" and 10 grams pressure.

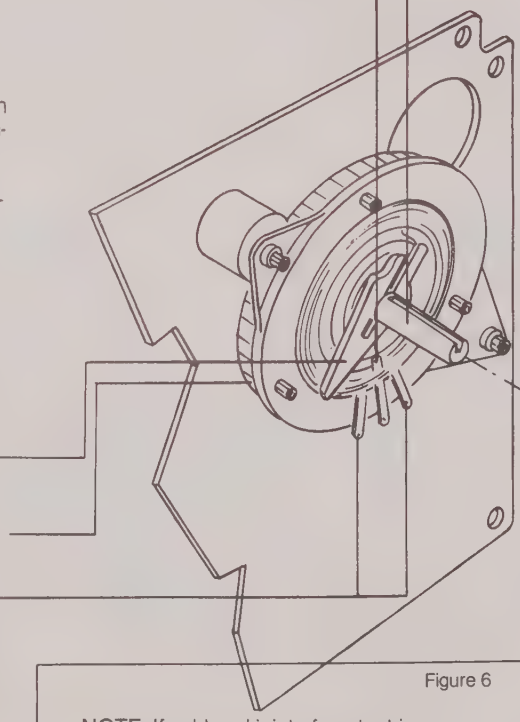


Figure 6

NOTE: If soldered joint of contact is colored blue and/or servo plate has label indicating wiper has 0.050 wiper deflection, set wiper an additional 0.025" by turning knurled knob of adjusting tool clockwise again, without disturbing adjusting tool, until inner sleeve is snug against wiper arm. Push knurled knob foward to its stop again. Contact deflection is now 0.050" and contact pressure is approximately 20 grams.

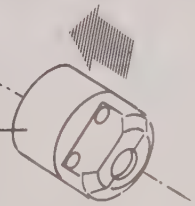
11
Grab the slotted end of the adjusting tool and rotate the contact wiper through its full travel. Be sure the wiper arm does not make contact with the 2–56 binding head screw that connects the collector coil and the collector terminal. Tighten the cap screw at the base of the wiper arm with bristo wrench 30360711–000.

12
Remove wiper adjust tool.

13
Connect black lead to zero terminal and white lead to (center) collector terminal. The red lead goes on the remaining third terminal and corresponds to 100% of range span. The blue shield lead is screwed to slidewire mounting plate with a 4–40 binding head screw.

14
Replace dust cover and plastic (common mode barrier) with 4–40 binding head screws. The plastic cover provides protection from shock caused by a difference of potential between the slidewire cover and the case.

15
Grab the taped cable drum and drive cable and move it toward servo shaft. Line it up with and push it onto shaft. Turn bull gear until flat in servo shaft is topside. Align drive cable with pulleys on instrument side plates. Tighten set screw on cable drum, making sure the set screw seats itself on flat of servo shaft. Remove tape from cable drum and drive cables.



NOTE:
The cable drum must be mounted on outermost part of servo shaft to clear the plastic cover on slidewire assembly. This will cause the drive cable to be offset at an angle with the idler pulleys on chassis side plates. Turn bull gear through its full travel and check clearance between cable drum and cable connecting bracket on carriage assembly. It will be narrow. If cable drum obstructs upscale movement of carriage assembly, loosen set screw in cable drum and push drum closer to the plastic cover. Tighten set screw and check again for adequate clearance.

16
Replace/close chassis top cover. Turn on power and check calibration.

Lubrication

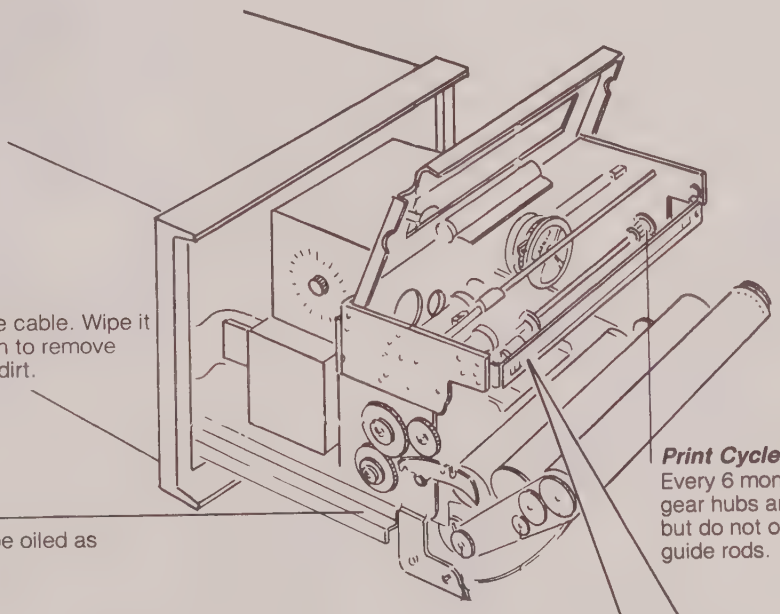
Use the high grade instrument oil supplied with the accessory kit. Wipe away any accumulated dirt from bearing surfaces before application of oil.

Oil lightly at all points mentioned below.

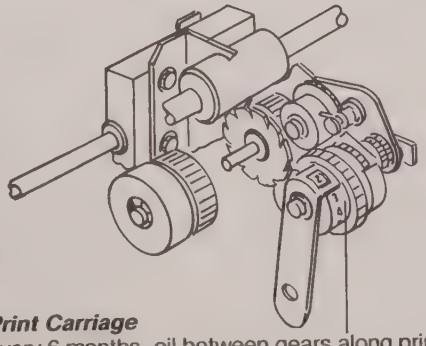
NOTE:
The servo (balancing) motor is factory-lubricated and does not require oiling.

NOTE:
Do not oil slidewire drive cable. Wipe it off with a clean dry cloth to remove any oil or accumulated dirt.

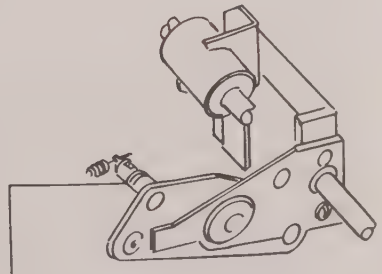
Chassis Slides
Chassis slides should be oiled as needed.



Print Cycle Drive
Every 6 months, oil gear hubs and clean but do not oil carriage guide rods.



Print Carriage
Every 6 months, oil between gears along print wheel shaft, on gear surfaces, ratchet teeth and torsion springs, but not on character or dot surfaces. Character and dot surfaces should be wiped clean of any oil. Also oil ink wheel shaft including spring washer, two idler gears and two spring shafts. **Avoid oil on print wheel.**



Select-O-Trend Cam
Every 6 months, oil the Select-O-Trend cam, cam shaft, cam surface.

Figure 7

Adjustments

Gain
Adjust sensitivity each month refering to operation section.

Dead Band
Frequency of adjustment will vary with type of use. Refer to calibration section for adjustment.

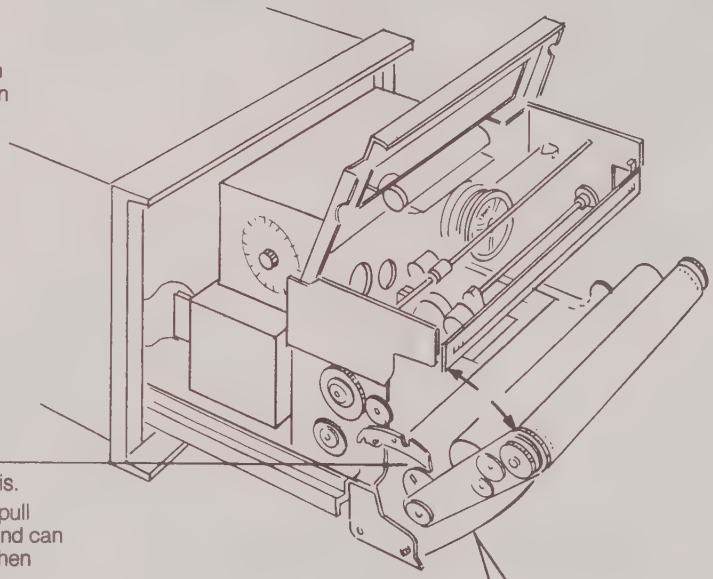


Chart Care

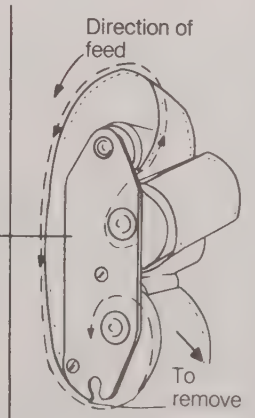
Chart Transport
Latch is located on each side of chassis.

To "open" transport for chart loading, pull latch(es) down. Transport is released and can swing to stop. Latching is automatic when transport is returned to position.

To remove transport, drop it forward to about 30° from vertical and lift. Replace by sliding the two yokes over bearings while holding transport in the 30° position.

Changing the Chart

Chart rolls are spring loaded to the left. Press rolls to the right to remove from or place into transport. Chart paper feeds under the upper roll, over the entire platen, and over the lower paper roll.



Transport need not be removed to change chart. You can cut or fold back the chart along the leading edge. This technique was originally intended for those instruments that require the chart to be fed through narrow slots, but it may also enhance chart reroll action.

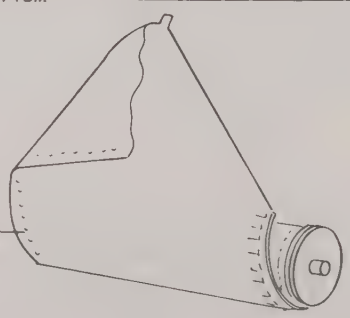


Figure 8

Chart Supply Indicator

Standard chart rolls are supplied with the TATTLE-TRACK feature. This inconspicuous red printed trace starts approximately 2 feet from the beginning of a 6 inch wide (Model 111) chart roll at the right hand edge, and progresses diagonally across to the lefthand edge at the end of the chart. The position of the trace relative to 0–100% of scale gives the percent of chart remaining at any given time. On a 11 inch wide (Model 112) chart, the trace starts approximately 22 feet from the beginning of the roll at the edge, and progress diagonally across to the edge at the end of the chart. The position of the trace relative to 0–100% of scale gives the percent of chart used at any given time. The trace is "feathered" so it cannot be confused with the record.

You may find it convenient to calculate the running time between chart change. In this way you can predict when the chart will run out and avoid inopportune interruptions.

CHART USAGE TABLE

Chart Speed	Running Time
1"/hr	61 days
2"/hr	30.5 days
4"/hr	15.75 days
8"/hr	7.87 days
20"/hr	3 days

Chart Tear-Off

Use any sharp edge (pencil point, screwdriver, etc.) across top edge of platen to quickly remove chart. After tearing off chart, attach fresh edge to reroll tube or hang a weight on the edge; otherwise chart may curl up over the pen or scale.

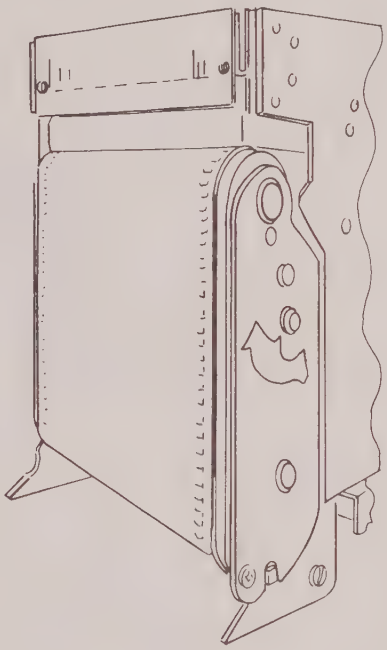


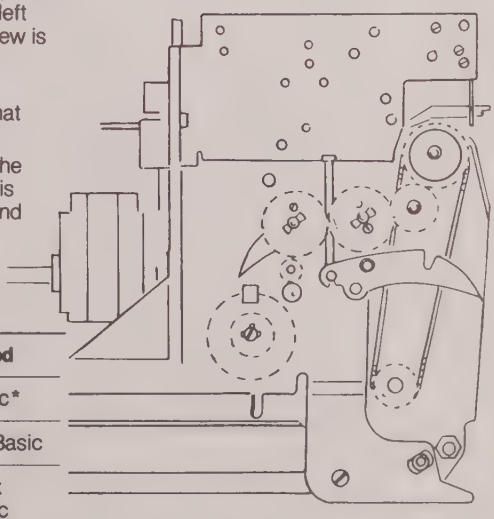
Figure 9

Chart Drive Gears

To change speed of chart drive, interchange drive gears located on left side of chassis. A slot-head screw is used to retain gears and make changing easier.

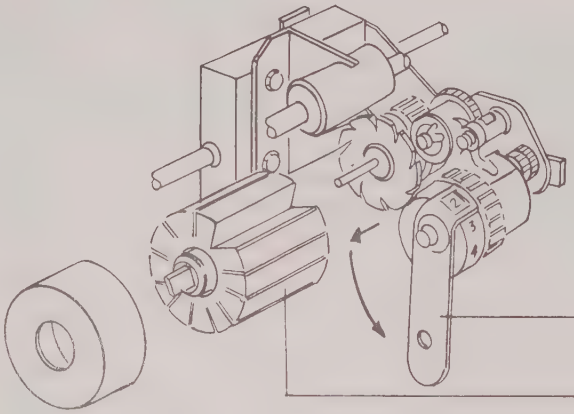
Alternate gears are bolted on that same side.

*Basic speed is detemined by the chart motor used. Basic speed is stamped on instrument right hand nameplate.



Position A	Position B	Speed
60T Gear	60T Gear	Basic*
80T Gear	40T Gear	2 x Basic
40T Gear	80T Gear	1/2 x Basic

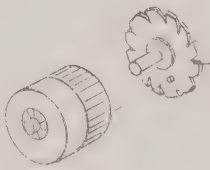
Figure 10



Changing Ink Wheel

1
Swing ink wheel retaining arm out, then down.

2
Carefully slide ink wheel from shaft.



Replacing Ink Wheel

(12 records or fewer)
When replacing ink wheel align locating pin before sliding wheel back onto shaft. Be sure not to jam ink wheel barrier into raised characters of print wheel. Slide ink wheel on so that locating pin strikes just clockwise of the locating hole, then turn ink wheel slightly counterclockwise so that pin snaps into hole. This insures no back lash occurs in gears.

TABLE 1 - Sequence and Color

Number of Records					
2	**3**	**4**	**6**	**12**	**24**
1 purple	1 purple	1 purple	1 purple	1 purple	1–2 purple
2 red	2 red	2 red	2 red	2 red	3–4 red
1 purple	3 black	3 black	3 black	3 black	5–6 black
2 red	1 purple	4 blue	4 blue	4 blue	7–8 blue
1 purple	2 red	1 purple	5 green	5 green	9–10 green
2 red	3 black	2 red	6 brown	6 brown	11–12 brown
1 purple	1 purple	3 black	1 purple	7 purple	13–14 purple
2 red	2 red	4 blue	2 red	8 red	15–16 red
1 purple	3 black	1 purple	3 black	9 black	17–18 black
2 red	1 purple	2 red	4 blue	10 blue	19–20 blue
1 purple	2 red	3 black	5 green	11 green	21–22 green
2 red	3 black	4 blue	6 brown	12 brown	23–24 brown

(24 Records)
Align key with keyway and push ink wheel onto shaft. Be sure not to jam ink wheel into raised characters of print wheel.

Changing Ink Pads
Push down new felt pads so that they fit firmly in the wheel assembly. See Table 1 for sequence and color.

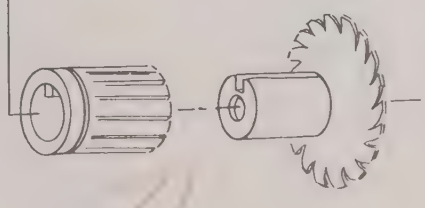


Figure 11

Access To Servo

Remove chassis from case. Servo package is under chassis. To expose components, loosen captive screw in center of cover, then remove cover.

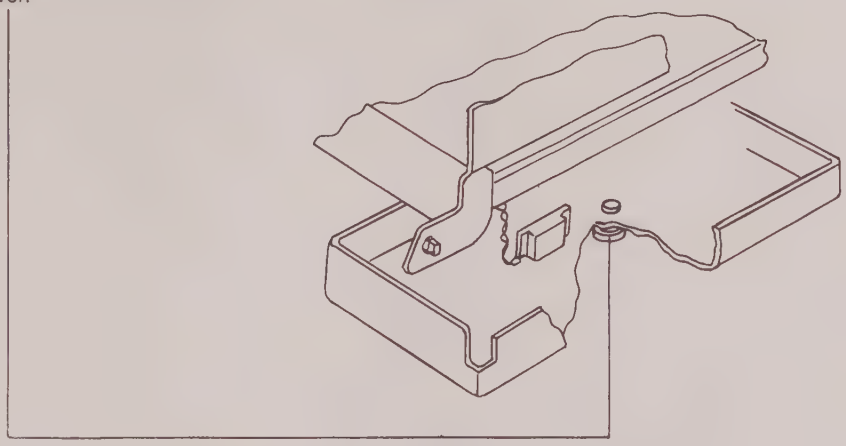


Figure 12

Removing Servo Package

It is not necessary to remove servo package to change measuring circuit unit, constant voltage unit, or most other components. If for any reason removal becomes necessary:

1 Disconnect servo package output terminals from J2 connector block on rear deck of chassis.

2 Disconnect plug to measuring circuit unit (MCU) in front right corner of servo package.

3 Loosen retaining screw to permit servo package to slide forward to clear keyhole slots, then package will drop free.

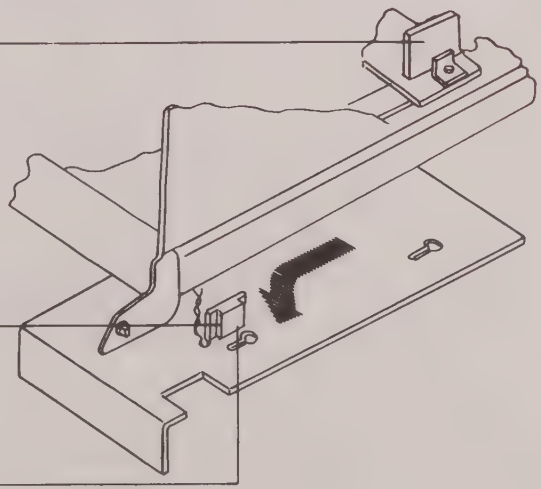


Figure 13

Servo Package Components

Standard orientation of components in the servo package:

1
Measuring Circuit Unit (MCU)

2
Constant Voltage Unit (CVU)

3
Power Transformer

4
Amplifier Board

For further details, see parts list.

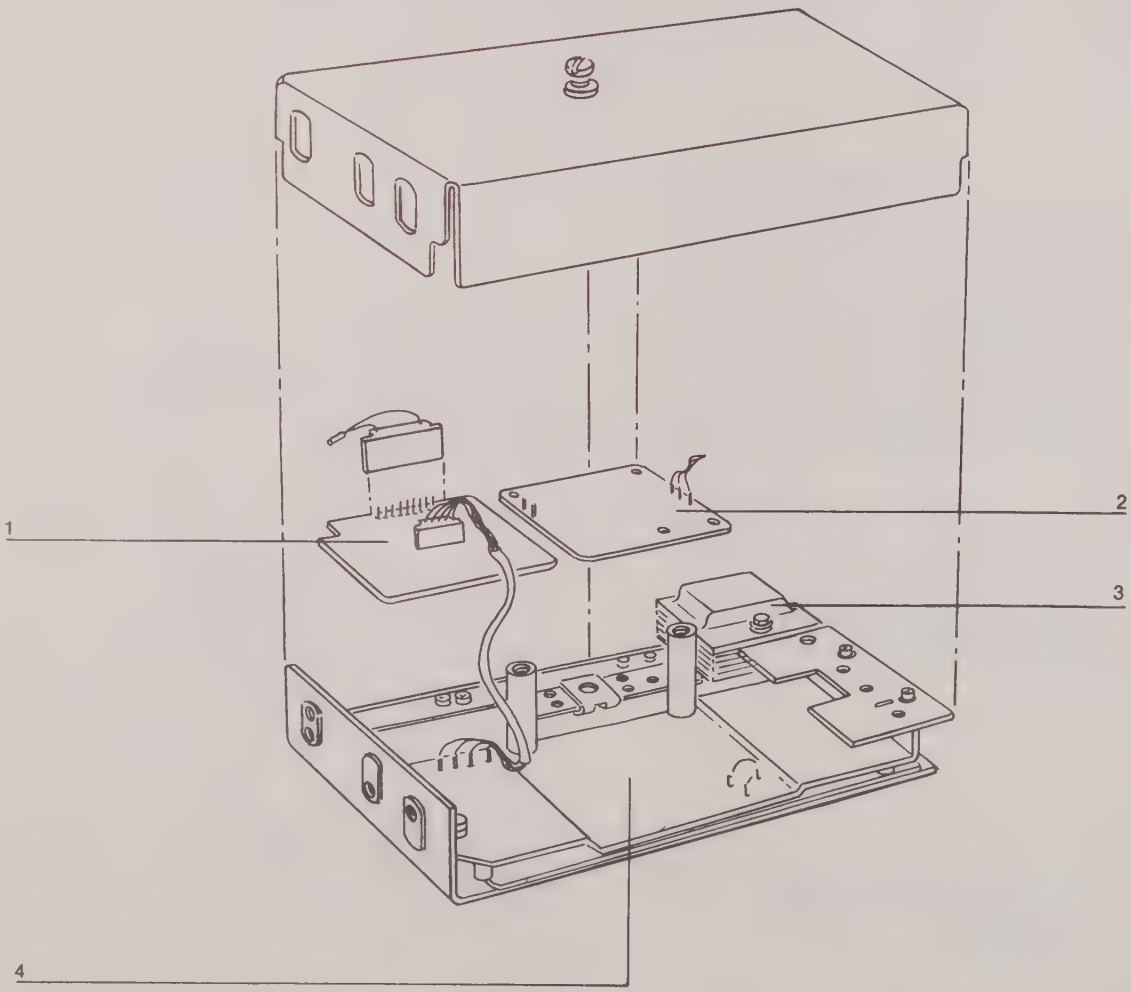
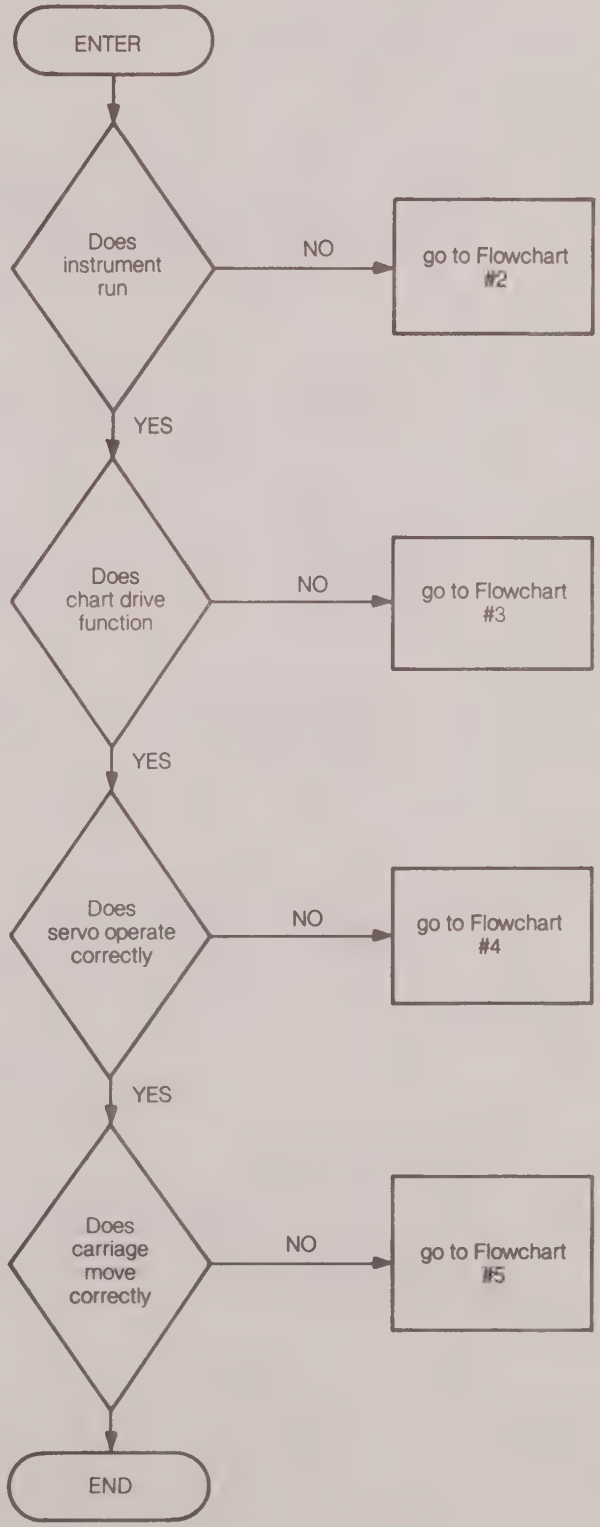
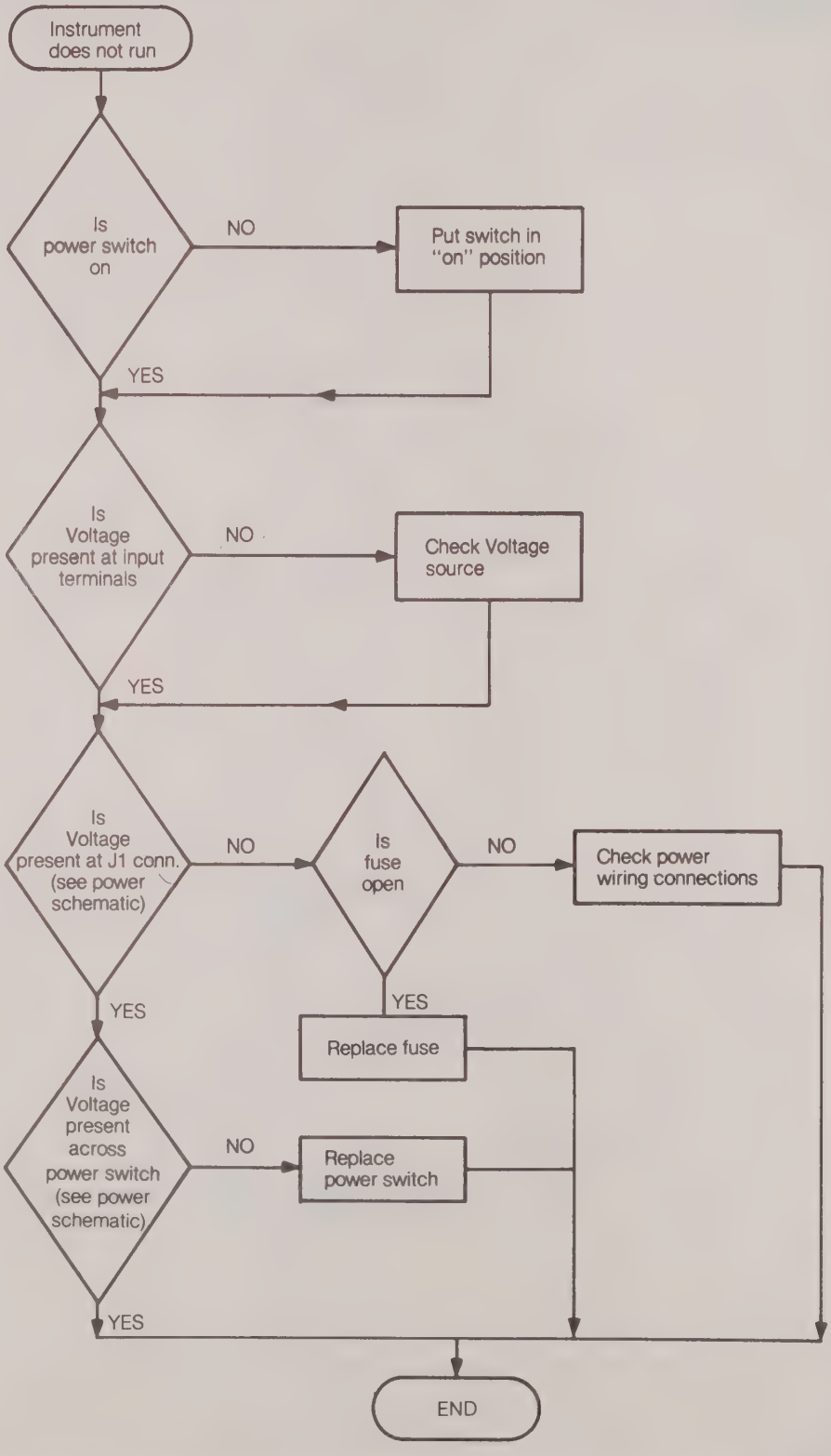


Figure 14

Troubleshooting
Flowchart #1



Flowchart #2


Instrument does not run
Is power switch on
NO
Put switch in "on" position
YES
Is Voltage present at input terminals
NO
Check Voltage source
YES
Is Voltage present at J1 conn. (see power schematic)
NO
Is fuse open
NO
Check power wiring connections
YES
YES
Replace fuse
Is Voltage present across power switch (see power schematic)
NO
Replace power switch
YES
END

Flowchart #3

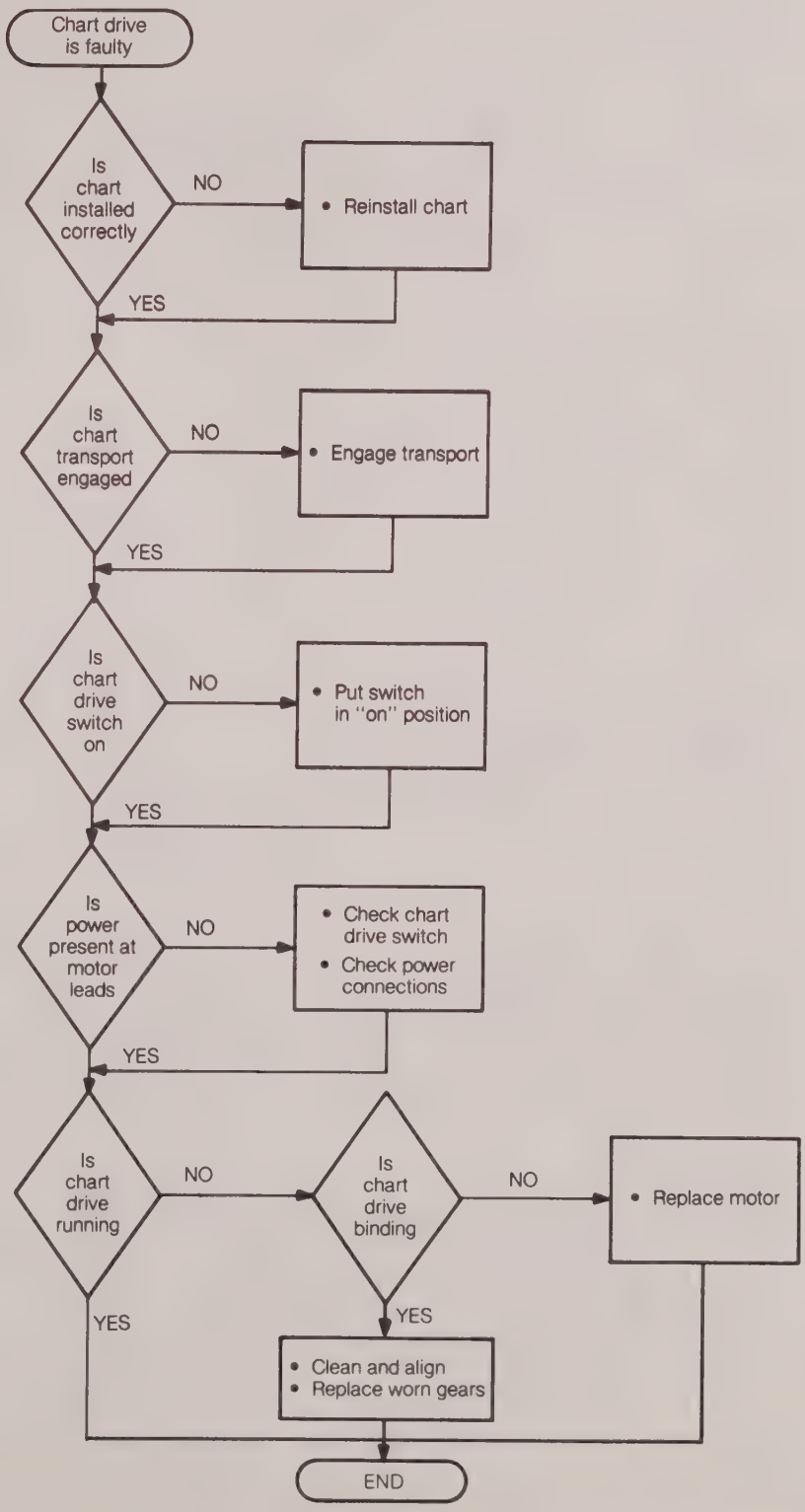
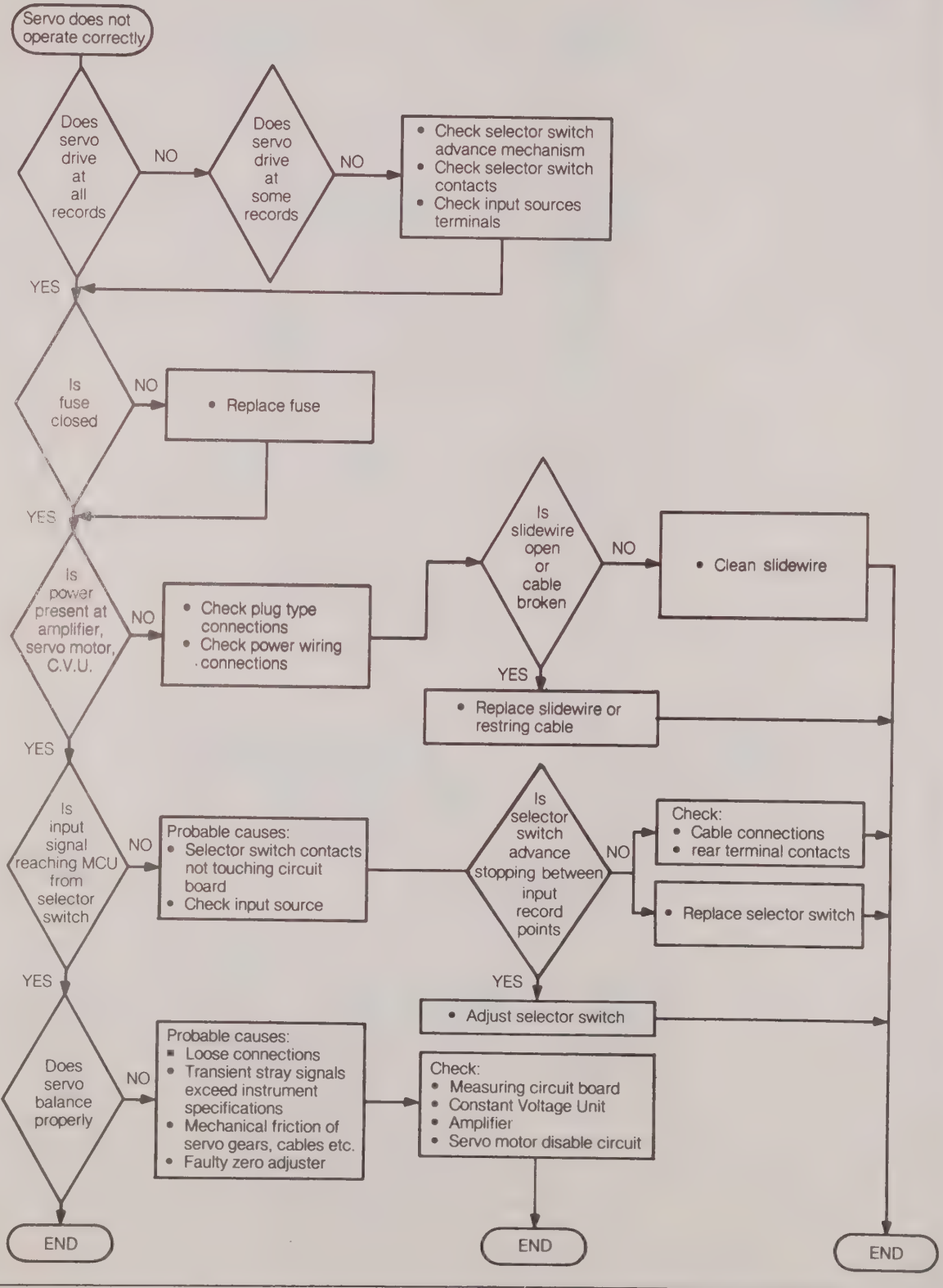
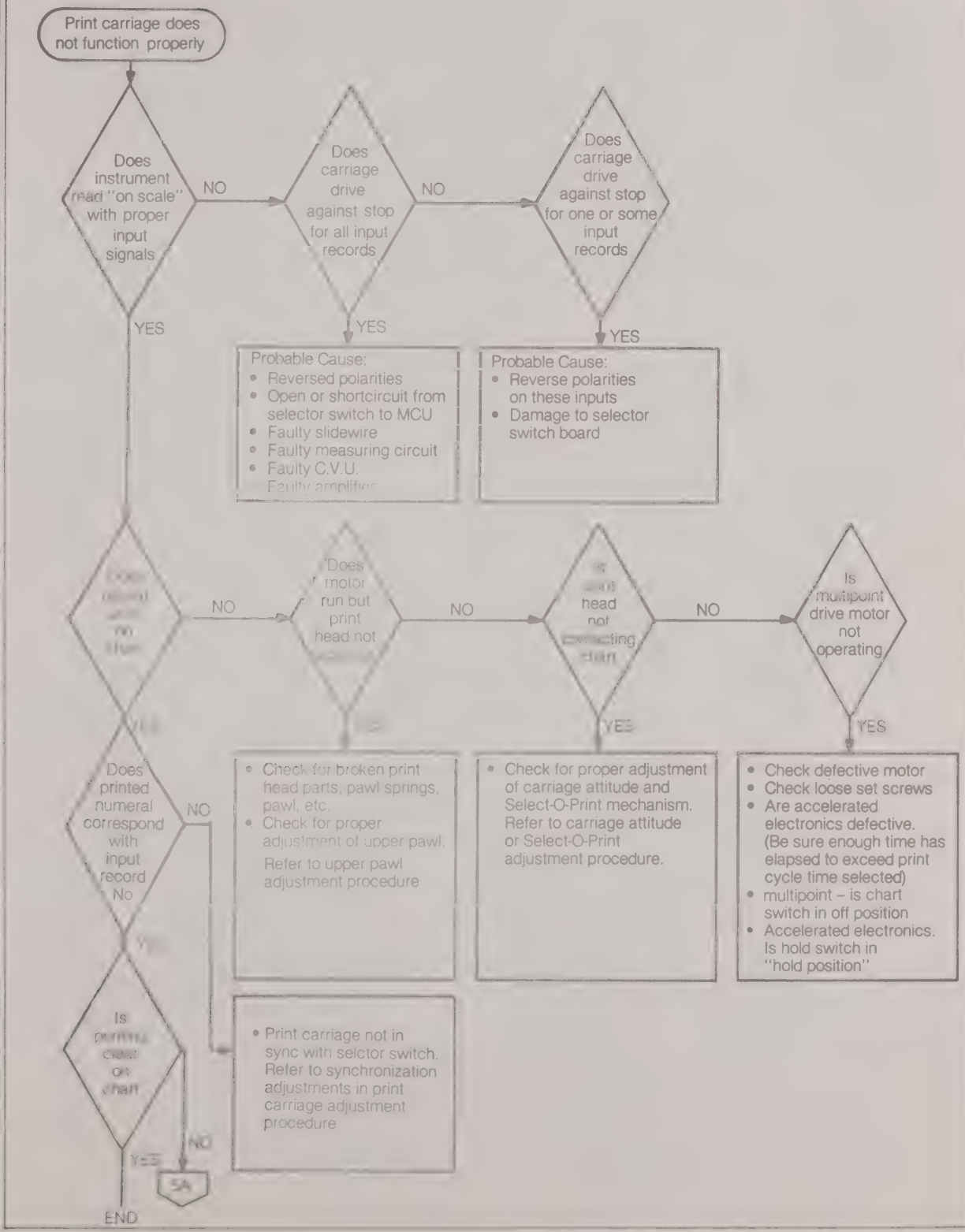


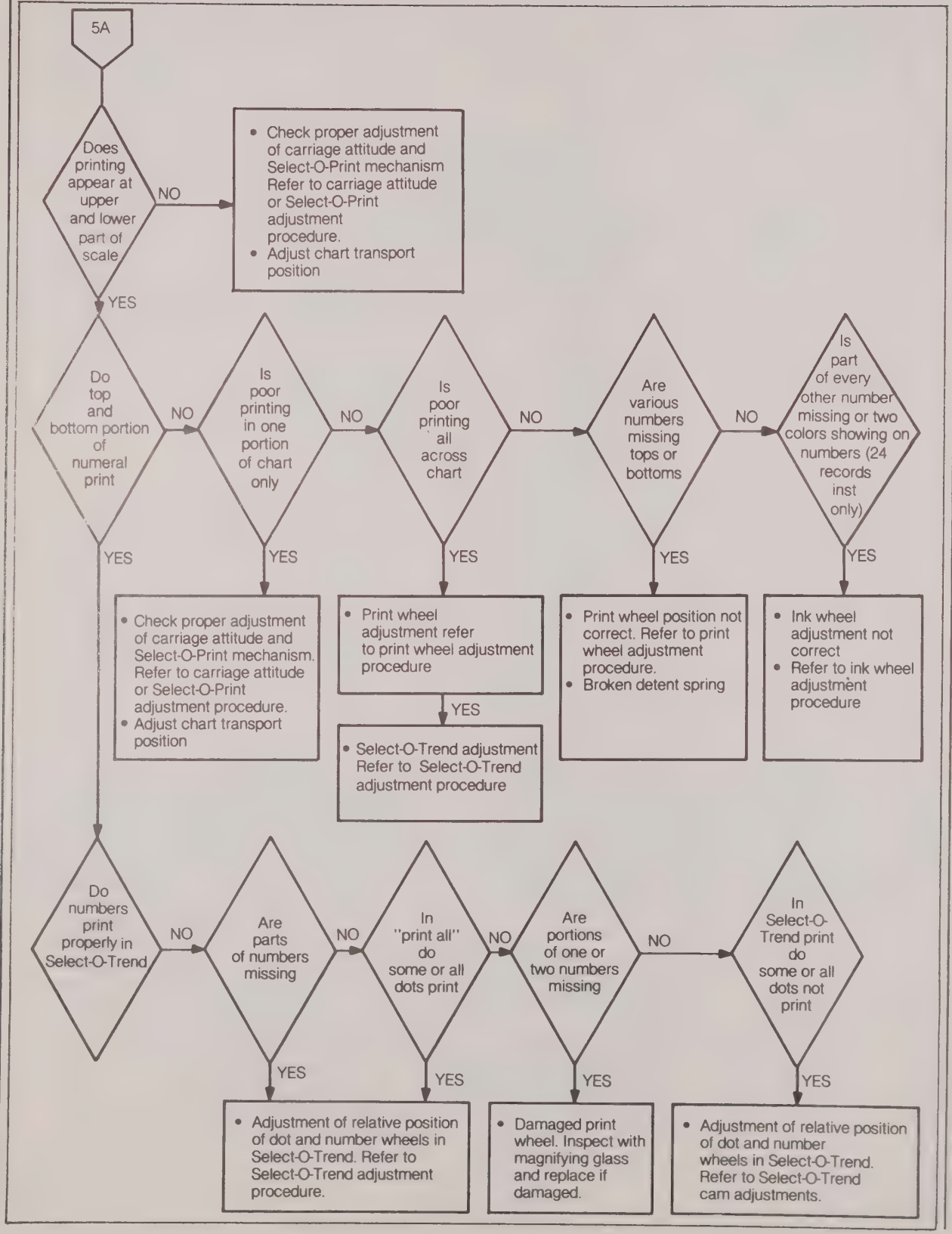
Chart drive is faulty
Is chart installed correctly
NO
• Reinstall chart
YES
Is chart transport engaged
NO
• Engage transport
YES
Is chart drive switch on
NO
• Put switch in "on" position
YES
Is power present at motor leads
NO
• Check chart drive switch
• Check power connections
YES
Is chart drive running
NO
Is chart drive binding
NO
• Replace motor
YES
YES
• Clean and align
• Replace worn gears
END

Flowchart #4

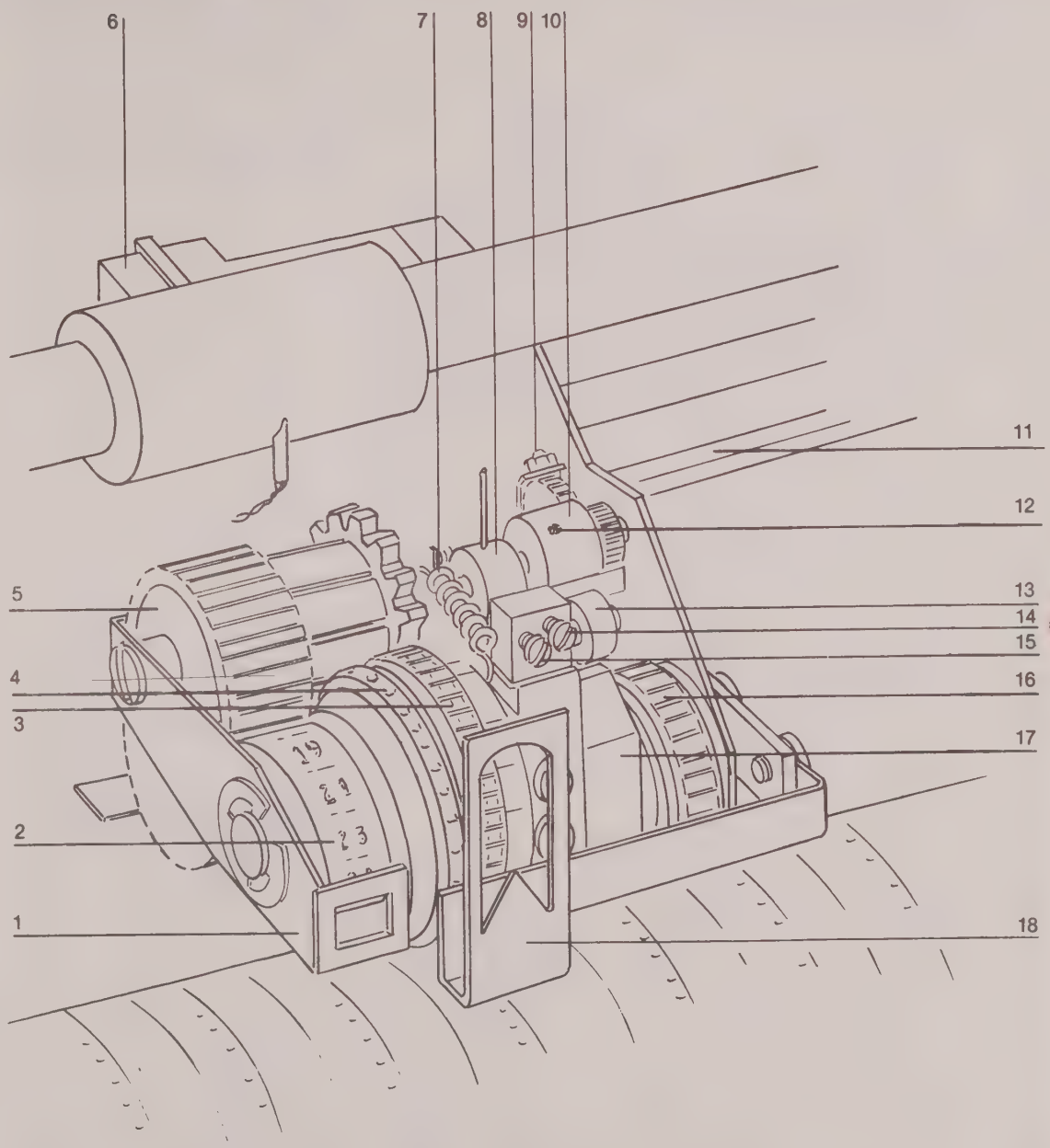

Servo does not operate correctly
Does servo drive at all records
NO
Does servo drive at some records
NO
• Check selector switch advance mechanism
• Check selector switch contacts
• Check input sources terminals
YES
Is fuse closed
NO
• Replace fuse
YES
Is power present at amplifier, servo motor, C.V.U.
NO
• Check plug type connections
• Check power wiring connections
Is slidewire open or cable broken
NO
• Clean slidewire
YES
• Replace slidewire or restring cable
YES
Is input signal reaching MCU from selector switch
NO
Probable causes:
• Selector switch contacts not touching circuit board
• Check input source
Is selector switch advance stopping between input record points
NO
Check:
• Cable connections
• rear terminal contacts
• Replace selector switch
YES
• Adjust selector switch
YES
Does servo balance properly
NO
Probable causes:
• Loose connections
• Transient stray signals exceed instrument specifications
• Mechanical friction of servo gears, cables etc.
• Faulty zero adjuster
Check:
• Measuring circuit board
• Constant Voltage Unit
• Amplifier
• Servo motor disable circuit
END
END
END

Flowchart #5


Print carriage does not function properly
Does instrument read "on scale" with proper input signals
NO
Does carriage drive against stop for all input records
NO
Does carriage drive against stop for one or some input records
YES
YES
YES
Probable Cause:
• Reversed polarities
• Open or shortcircuit from selector switch to MCU
• Faulty slidewire
• Faulty measuring circuit
• Faulty C.V.U.
• Faulty amplifier
Probable Cause:
• Reverse polarities on these inputs
• Damage to selector switch board
NO
NO
NO
Is multipoint drive motor not operating
YES
YES
• Check for broken print head parts, pawl springs, pawl, etc.
• Check for proper adjustment of upper pawl. Refer to upper pawl adjustment procedure
• Check for proper adjustment of carriage attitude and Select-O-Print mechanism. Refer to carriage attitude or Select-O-Print adjustment procedure.
• Check defective motor
• Check loose set screws
• Are accelerated electronics defective. (Be sure enough time has elapsed to exceed print cycle time selected)
• multipoint – is chart switch in off position
• Accelerated electronics. Is hold switch in "hold position"
Does printed numeral correspond with input record No
NO
• Print carriage not in sync with selctor switch. Refer to synchronization adjustments in print carriage adjustment procedure
NO
YES
5A
END


5A
Does printing appear at upper and lower part of scale
NO
• Check proper adjustment of carriage attitude and Select-O-Print mechanism Refer to carriage attitude or Select-O-Print adjustment procedure.
• Adjust chart transport position
YES
Do top and bottom portion of numeral print
NO
Is poor printing in one portion of chart only
NO
Is poor printing all across chart
NO
Are various numbers missing tops or bottoms
NO
Is part of every other number missing or two colors showing on numbers (24 records inst only)
YES
YES
YES
YES
YES
• Check proper adjustment of carriage attitude and Select-O-Print mechanism. Refer to carriage attitude or Select-O-Print adjustment procedure.
• Adjust chart transport position
• Print wheel adjustment refer to print wheel adjustment procedure
YES
• Select-O-Trend adjustment Refer to Select-O-Trend adjustment procedure
• Print wheel position not correct. Refer to print wheel adjustment procedure.
• Broken detent spring
• Ink wheel adjustment not correct
• Refer to ink wheel adjustment procedure
Do numbers print properly in Select-O-Trend
NO
Are parts of numbers missing
NO
In "print all" do some or all dots print
NO
Are portions of one or two numbers missing
NO
In Select-O-Trend print do some or all dots not print
YES
YES
YES
YES
• Adjustment of relative position of dot and number wheels in Select-O-Trend. Refer to Select-O-Trend adjustment procedure.
• Damaged print wheel. Inspect with magnifying glass and replace if damaged.
• Adjustment of relative position of dot and number wheels in Select-O-Trend. Refer to Select-O-Trend cam adjustments.

Print Carriage Adjustments

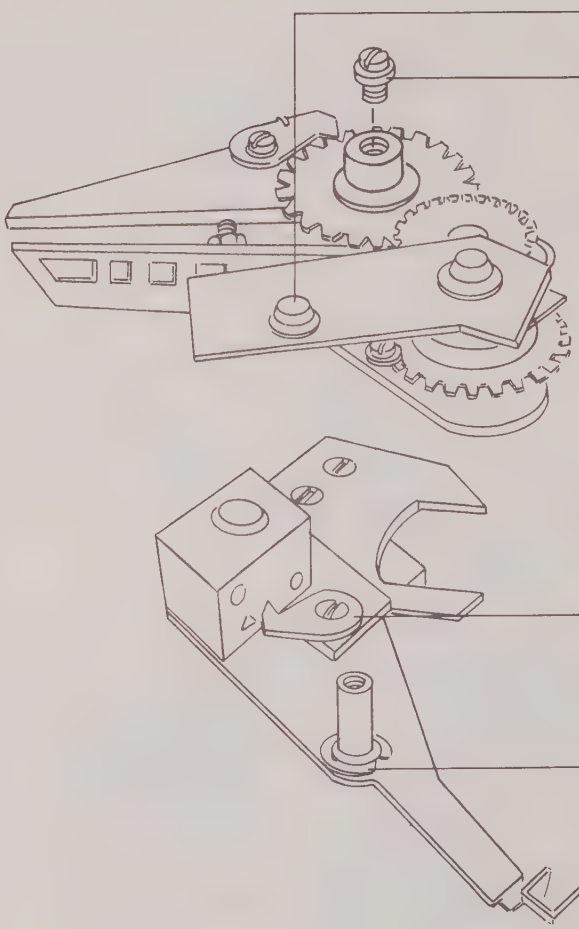


LEGEND

1. Ink wheel bracket
2. Number strip
3. Print wheel
4. Dot wheel
5. Ink wheel
6. Front bearing bracket
7. Numerical print extension spring
8. Select-O-Trend cam and lever
9. Select-O-Print adjusting set screw and nut
10. Select-O-Trend cam w/projecting set screw
11. Square rod for Select-O-Print
12. Set screw for Select-O-Trend cam
13. Roller
14. Print wheel adjustment screw
15. Select-O-Trend adjusting screw
16. Anti backlash detent gear
17. Bearing block
18. Indicator

Figure 15

Remove Carriage (24 Records)



1
Remove bracket holding ink wheel.

2
Remove screw on ink wheel hub and remove ink wheel.

3
Lift upper pawl from toothed ratchet and hold up out of way.

4
Grasp carriage and pull off shaft.

5
Leave four pointed spring washer and flat washer on shaft.

NOTE: Flat washer should be under spring washer.

Disengage Orbiting Drive Gear

1
Loosen two set screws holding orbiting drive gear to shaft and disengage gear from geneva drive.

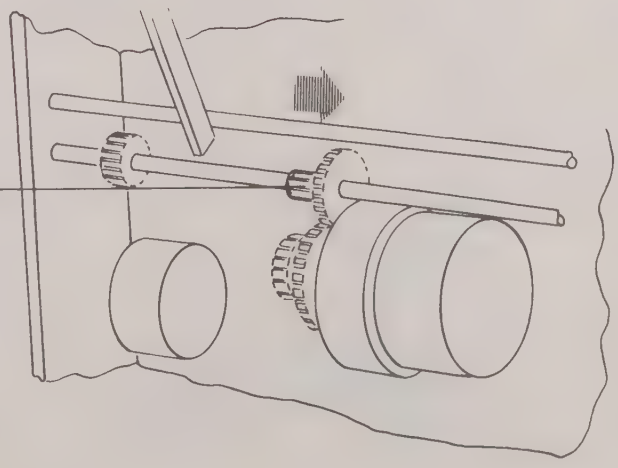
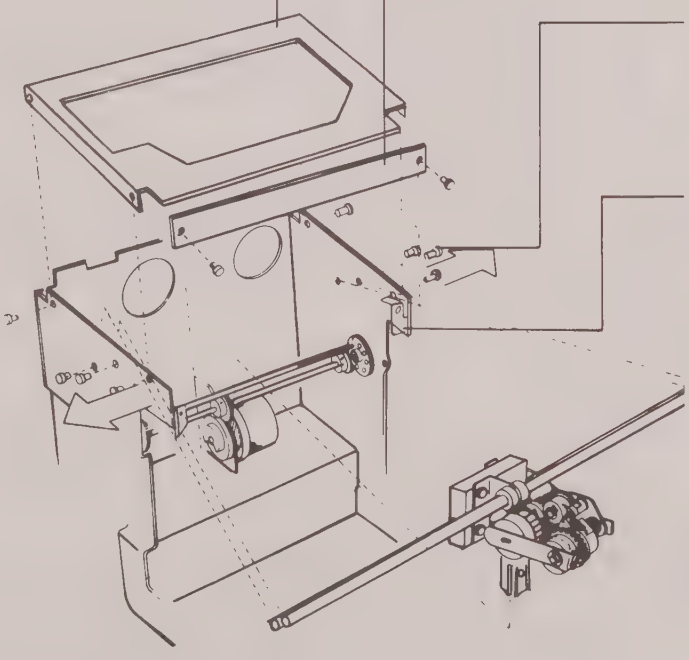


Figure 16

Remove Carriage (12 Records or Fewer)



It is not necessary to remove carriage to adjust it. However, if you prefer to do so:

1
Remove chassis top (held by 4 screws on side plates) and scale (held by 2 screws). Fluorescent lighting option need not be removed.

2
Unclamp from servo cable.

3
Remove carriage rod screws (on side plates).

4
Spring side plates slightly outward (rods have slight shoulders on ends) to free rods.

Rods with carriage will fall free, lift them clear of orbiting rod.

5
Reverse procedure for reassembly. Take care to guide carriage onto orbiting rod.

6
Align carriage with chart and scale as described in carriage attitude adjustment.

7
Check all multipoint alignments described in this section.

Figure 17

Anti Backlash Detent Adjustment (24 Record)

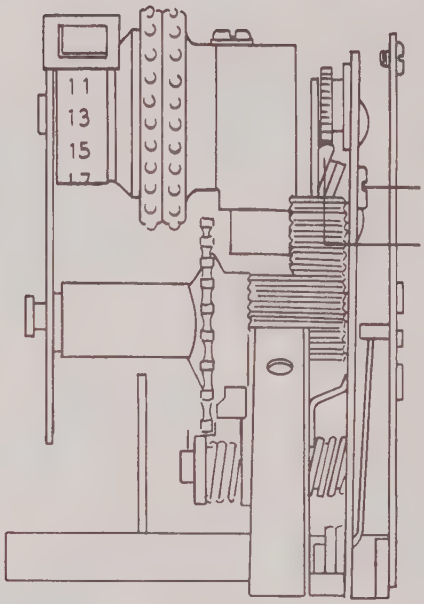


Figure 18

1
Remove print head from instrument. (See Figure 16.)

2
Loosen detent pivot mounting screw.

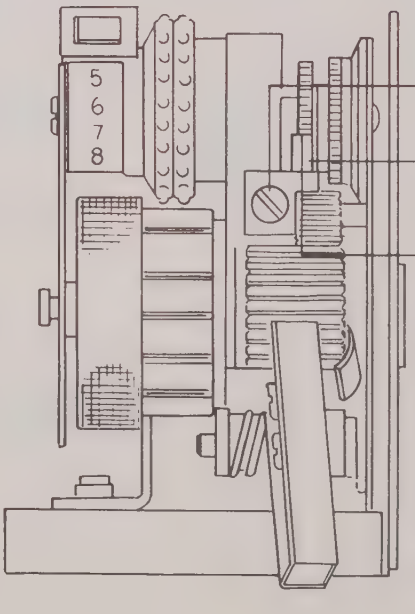
3
Rotate print wheel counterclockwise and backload geartrain until approximately 0.005" gap appears between ratchet tooth and lower pawl.

4
While maintaining back pressure, press the detent into gear tooth. Maintain gap between pawl and ratchet and tighten mounting screw.

5
Replace carriage.

6
Crank Carriage. Bottom pawl must fall into ratchet before detent falls into its gear with carriage lowered into printing position. Dot wheel must be locked in place.

Anti Backlash Detent Adjustment (12 Records or Fewer)



1
Loosen screw holding detent spring to underside of print wheel bearing block.

2
Slide spring backward or forward to engage 24 tooth numeral print gear.

3
Use a 0.0045" shim between detent top and face of engaging teeth surface and adjust detent spring to within 0.0045" of its maximum forward position.

4
Make sure stop pawl is held firmly against ratchet teeth.

5
Tighten screw under print wheel bearing block.

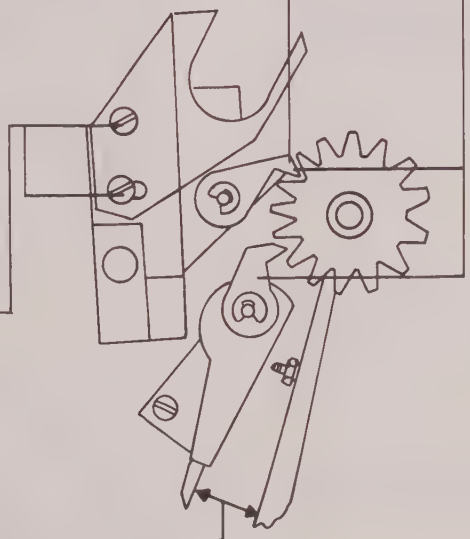
6
Replace carriage.

Figure 19

Carriage Attitude Adjustment

1
Rotate orbiting rod until both pawls are in place.

2
Insure an 0.030 space between upper pawl and ratchet for proper carriage function. Crank* carriage around to assure both pawls function.



3
Make sure Select-O-Print trip lever is in the multipoint mode (locking pin is hooked behind advance mechanism plate).

4
Place Select-O-Trend cam in multipoint mode (forward position).

5
Slightly loosen two retention screws on upper bearing bracket. The upper screw is the pivot, the lower screw is the lock.

6
With chart transport in up position, crank carriage until jaws are at widest position (print wheel is fully down in print position). Adjust bearing bracket until jaws close to the minimum opening by moving pointer bracket up or down.

7
Tighten (2) screws in bearing bracket.

*Screw crank into end of orbiting rod on outside of right-hand side plate.

Figure 20

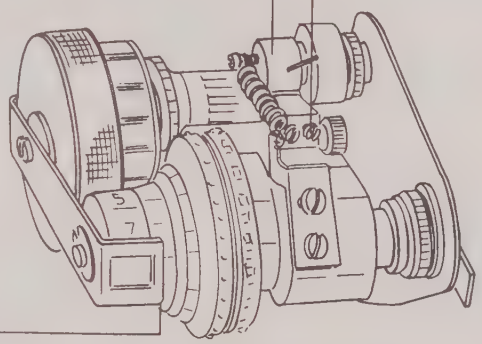
Print Wheel Adjustments (24 Records)

1
Make sure carriage is in the multipoint mode (Select-O-Trend cam forward).

2
Adjust print wheel until slightly below dot wheel. Use right hand adjusting screw.

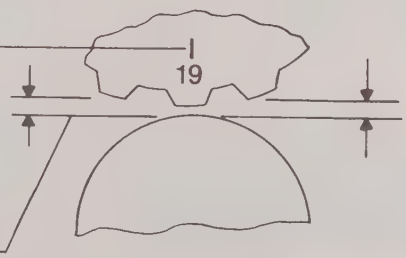
3
Make sure Select-O-Print trip lever is in the multipoint mode.

4
Crank carriage until one set screw in ratchet gear is accessible from top.



5
Loosen two set screws in dot wheel hub.

6
Mark side of #19 on print wheel with pencil.



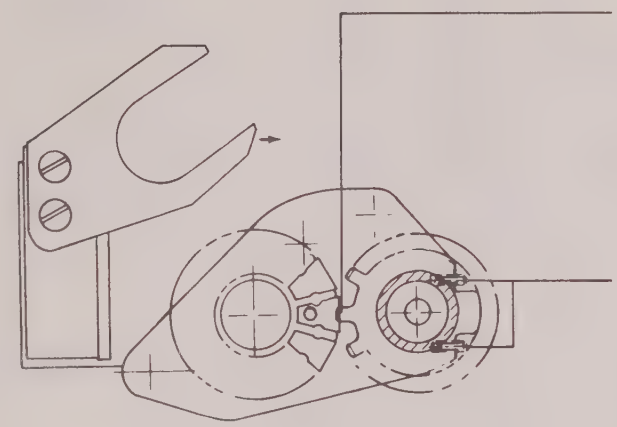
7
At 100% full scale, manually position print wheel so that #19 is perpendicular to chart drum. Assure that there is equal spacing between numbers before and after #19.

Figure 21

8
Crank orbiting rod and lower print wheel to chart until it is held to chart by force of orbiting rod on jaws. Tighten (1) one set screw in dot wheel. To assure setting, crank print wheel and check position of other characters. Tighten other set screw.

NOTE:
When #19 is positioned to chart, one set screw on dot wheel should be accessible from top. If not, remove dot wheel carefully so that detent will not be lost. Rotate dot wheel 90° to put set screw in up position and reassemble.

Print Wheel Adjustment (12 Records or Fewer)



1
Loosen set screws in print wheel and align print wheel to ink wheel so that first character engages the same ink pad (normally purple) in line with drive pin.

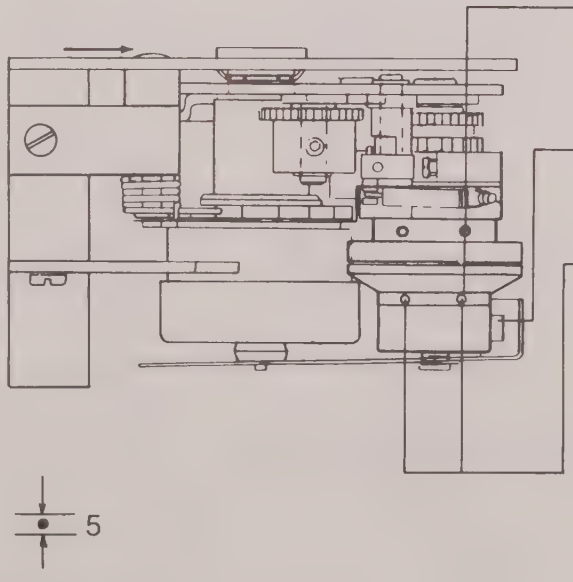
2
Back rotate ink wheel to eliminate gear train backlash.

3
Adjust set screws in print wheel hub until print wheel is radially positioned around its shaft and all numerals print fully and clearly in both Select-O-Trend and normal printing modes.

NOTE: If center of numeral 12 is adjusted to within 0.005 inch of center line between print wheel and chart drum all characters will print clearly all along and around chart drum.

Figure 22

Dot Wheel Adjustments (12 Records or Fewer)



1
Loosen set screws in dot wheel and rotate wheel until set screws are approximately in line (axially) with those of numeral wheel.

2
Numeral indicator band will now display proper character through window when that character is printed.

3
Radially align dot wheel to numeral wheel so that all dots are centered from top to bottom as closely as possible to adjacent print wheel characters. Loosen set screws in dot wheel hub and adjust those screws to rotate dot wheel into alignment in reverse direction (clockwise as viewed from left side of carriage) from its normal rotation.

4
Tighten set screws.

Figure 23

Select-O-Print Adjustments

The purpose of the Select-O-Print adjustment is to provide proper clearance between the print wheel and the chart during Select-O-Print point skipping.

6
Hold the Select-O-Print lever against the Select-O-Print wheel (Select-O-Print trip in point skip position).

1
Make sure button on Select-O-Print Program wheel lines up with arrow on skip lever.

2
Loosen set screw in the center of the bearing on the Select-O-Print lever to allow wire link freedom of movement.

3
Position all the programming trip buttons on the Select-O-Print wheel for point skip (long portion of trip pointing to center of wheel).

4
Crank orbiting rod to position the print head approximately halfway down on the printing stroke.

7
Tighten the set screw on the bearing locking wire link.

8
Crank the orbiting rod until yoke is at its widest position.

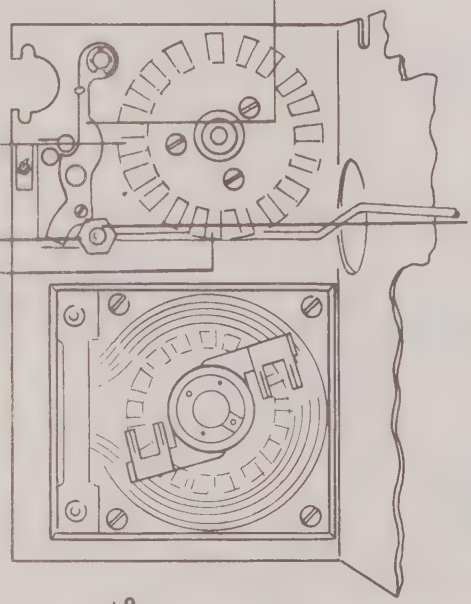


Figure 24

9
Loosen the nut on the adjusting set screw that is in contact with the bearing on the actuating plate.

10
Loosen pivot screw.

11
Set the clearance between the print wheel surface and the chart at .035 to .045 inches at mid scale.

12
Adjust the Select-O-Print clearance by rotating the adjusting set screw (clockwise to increase gap).

13
Make sure adjusting set screw is in contact with bearing on actuating plate.

14
Tighten locknut.

15
Tighten pivot screw.

16
Crank orbiting rod and check for proper clearance of print wheel along entire surface of chart.

5
Rotate square rod until flat surface of the Select-O-Print cam in the rear of the print head is parallel to corresponding surface on the Select-O-Print link.

NOTE: Cam must not hit edge of notch in arm.

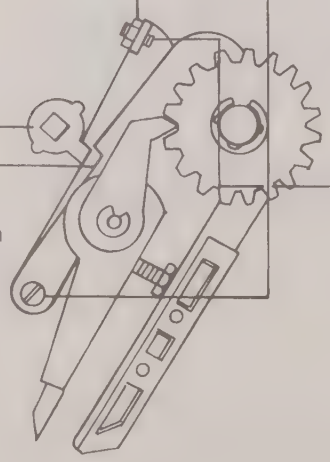


Figure 25

Upper Pawl Adjustment

1
With Select-O-Print lever in skip position crank carriage until jaws are at widest position.

2
With carriage in this position, loosen screw in top surface of the top pawl bracket and adjust the pawl until an 0.005" gap* is established.

3
Retighten screw on top pawl bracket.

*Non Select-O-Print instruments: Crank carriage until print wheel is on chart and jaws are at widest position. Set gap at 0.025" when in printing position.

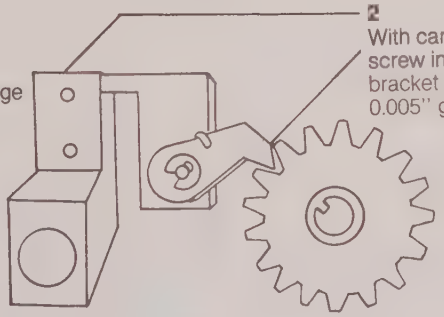


Figure 26

Ink Wheel Adjustment (24 Records)

1
Loosen two set screws in ratchet wheel hub.

2
Advance print mechanism until #19 is being printed.

3
Rotate ink wheel until key is pointing at the space between #1 and #24 on print wheel.

4
Start ink wheel onto shaft. Rotate ink wheel until purple pad is lined up with numerals 1 and 2.

5
Fully assemble ink wheel onto shaft. Tighten one set screw. Crank carriage to "walk" ink pads passed print wheel.

6
Check for centering by cranking carriage through once. If centered, tighten other set screw. If not centered, readjust.

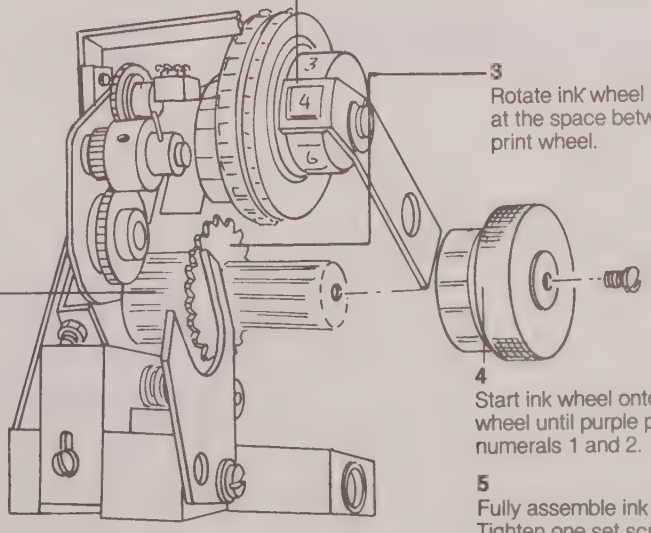
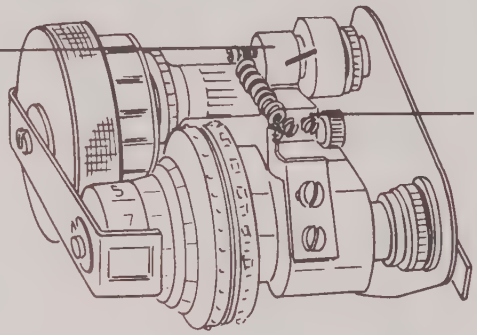


Figure 27

Select-O-Trend Adjustments

24 Record "Print All" Adjustment

1
Position Select-O-Trend cam in "print all" position (lever forward).



2
Turn screw on the right front of brass block clockwise until printed record does not contain complete dots.

3
Turn screw counterclockwise until complete printed dots are obtained on all records. Lock locking nut with wrench provided in accessory kit.

Figure 28

12 Record and Fewer "Print All" Adjustment

1
Select-O-Trend cam in "print all" position (lever forward).

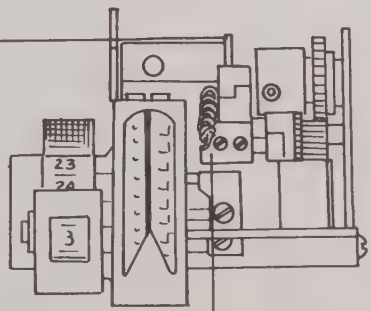


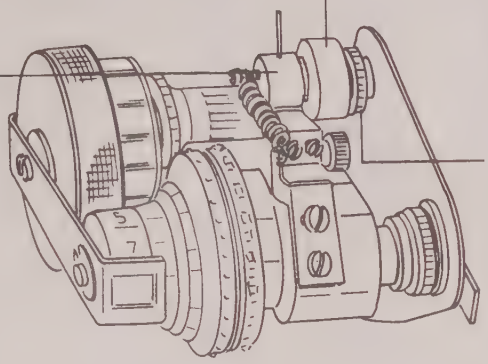
Figure 29

2
Turn hex head screw in upper portion of brass block counterclockwise until only partial dots are printed. (Make sure lever is forward.)

3
Turn hex screw clockwise until complete dots are obtained on all records. (Make sure lever is forward.)

Select-O-Trend Adjustments (Continued)

Select-O-Trend Cam Adjustments - 24 Record



1
Position Select-O-Trend cam in Select-O-Trend position (lever back).

2
Loosen non-projecting set screws that hold Select-O-Trend cam to its drive gear.

3
With chart transport in down position, advance print head to point of printing.

4
Rotate Select-O-Trend cam until projecting set screw points directly at center of roller follower. (Push cam on pivot block to allow set screw to be positioned on roller.)

5
Push cam against gear and tighten two non-projecting set screws.

Raise chart transport.

6
To properly position number wheel height during Select-O-Trend printing, turn projecting set screw counterclockwise until incomplete dots appear. Move set screw as little as possible.

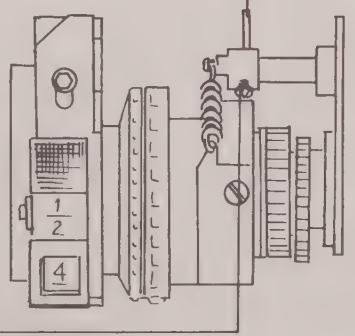
7
Turn set screw clockwise until complete dots are printed on all records.

Figure 30

Select-O-Trend Cam Adjustment - 12 Records or Fewer

The angular position of the Select-O-Trend cam is not adjustable. To adjust print wheel:

1
Position Select-O-Trend cam in Select-O- Trend position (lever back).



2
Turn set screw counterclockwise until only partial dots are printed.

3
Turn set screw clockwise until complete dots are printed.

Figure 31

Engage Orbital Drive Gear - No Select-O-Print

1. Jog power switch until bell shaped cam deactivates the servo disable switch.

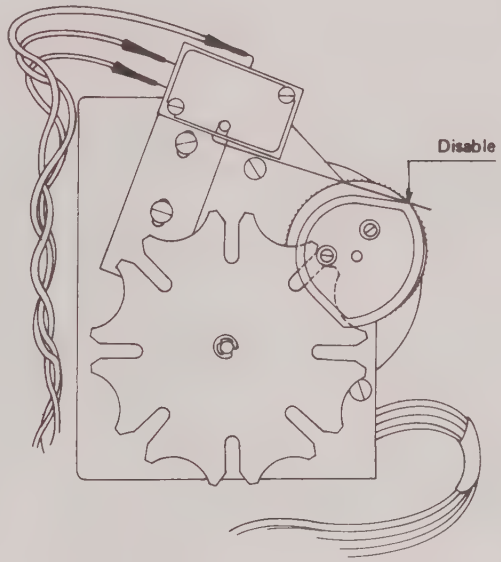


Figure 32

2. With gears disengaged, rotate oribiting rod until carriage starts downward movement. Stop carriage just above chart.
3. Without disturbing orbital rod and geneva drive gear, position set screws for front accessibility and engage gears.
4. Tighten screws.

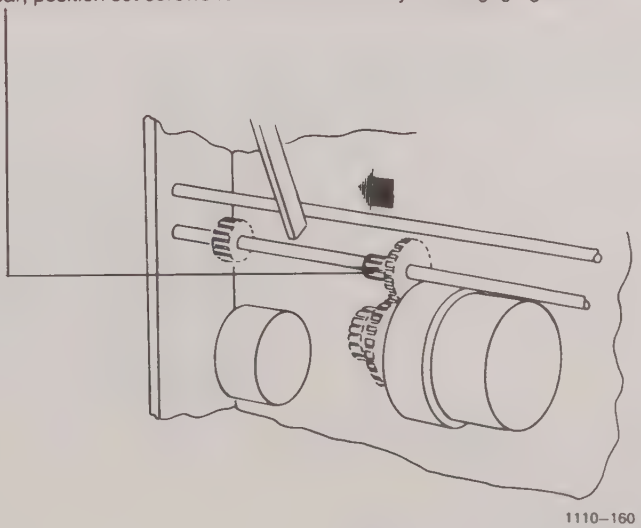


Figure 33

Engage Orbital Drive Gear - Unaccelerated Select-O-Print (Option 201)

1. Jog power switch until servo disable switch just activates.

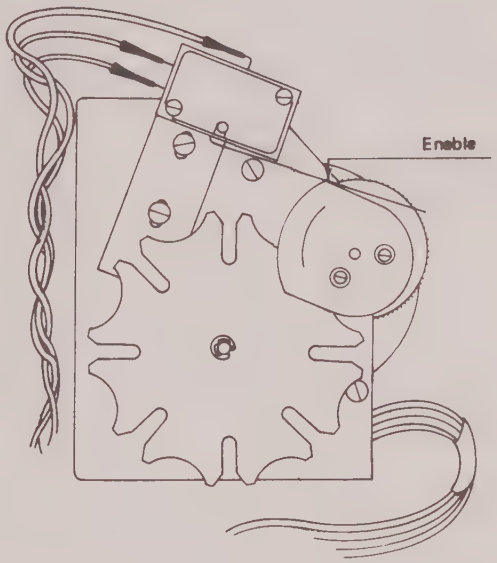
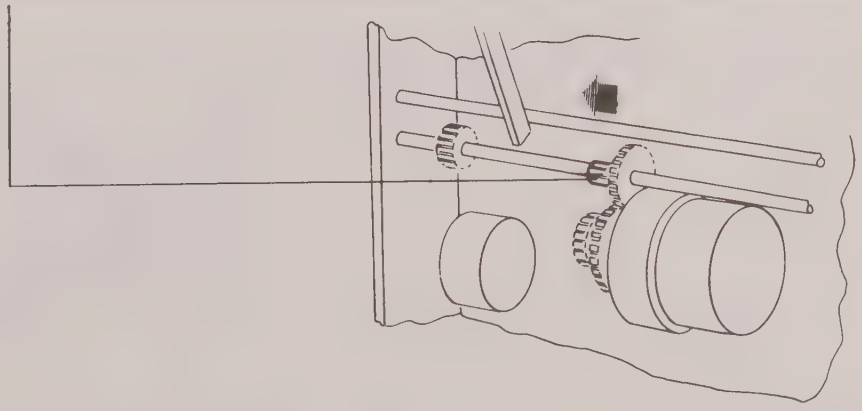


Figure 34

2. With gears disengaged, rotate orbiting rod until carriage is at top of travel – carriage up.
3. Without disturbing orbital rod and geneva drive gear, position set screws for front accessibility and engage gears.



1110–160

4. Tighten screws.
5. Turn power switch on and check for switch function. Servo motor enables when carriage is at top of travel and should disable when carriage is just above chart.*

   Servo motor enable and disable occurrence can be determined by manually displaying bull gear with power on. If servo motor does not enable when carriage is at top of travel and disable when carriage is positioned just above chart, repeat steps.

Figure 35

Engage Orbital Drive Gear - Accelerated Select-O-Print (Option 202)

1
Turn power on and allow geneva drive to index electrically to position vane to its neutral stopped position.

2
With gears disengaged, rotate orbiting rod until carriage starts downward movement. Stop carriage just above chart.

3
Without disturbing orbital rod and geneva drive gear, position set screws for front accessibility and engage gears.

4
Tighten set screws.

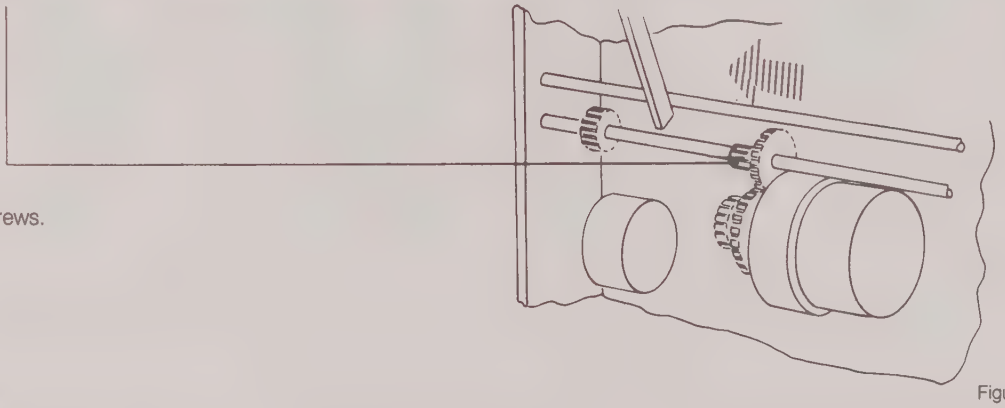


Figure 36

Print Carriage Alignment with Selector Switch

If print carriage is not in sync with selector switch (i.e. selector switch in on record 6 position and print wheel is printing 9), advance print wheel to number that corresponds to one number less than is indicated ready to print on selector switch.

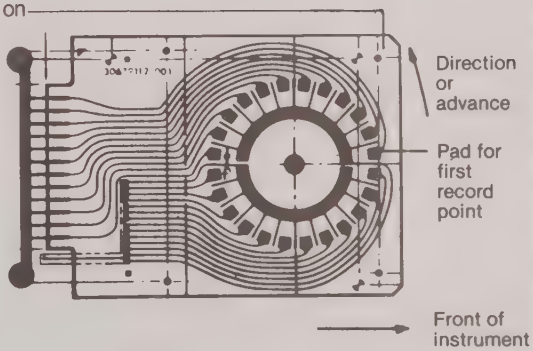


Figure 37

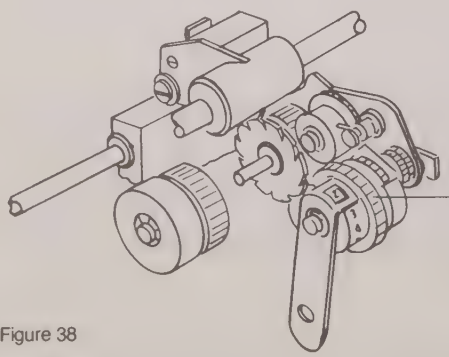


Figure 38

To advance print wheel, crank orbiting rod drive gear forward to raise print head to uppermost position. Rotate ink wheel toward you, one tooth at a time, as many times as needed to reach the required number on print wheel.

Carriage and selector switch will now be in sync.

Select-O-Range Program Wheel Adjustments

The Select-O-Range wheel adjustment insures alignment of arrow on mechanical switch lever with range selection button on program wheel.

Without Select-O-Print

① Loosen set screws in top pulley (Figure 39).

② Align arrow on mechanical switch lever with program wheel button that indicates record being recorded (Figure 40).

3. Tighten set screws.

With Select-O-Print

① Loosen set screws in Select-O-Range program wheel (Figure 41).

② Align arrow on mechanical switch lever with program button that indicates record being recorded (Figure 40).

3. Tighten set screws.

NOTE: Record number on Select-O-Range wheel should match record number on Select-O-Print wheel.

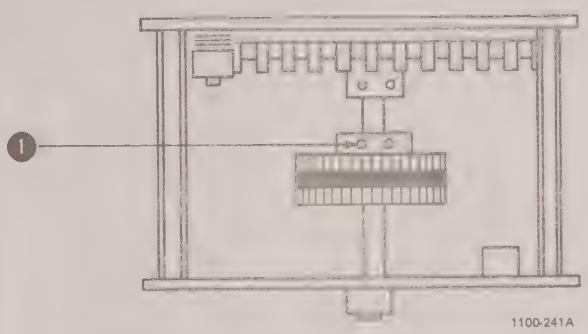


Figure 39 – Select-O-Range without Select-O-Print

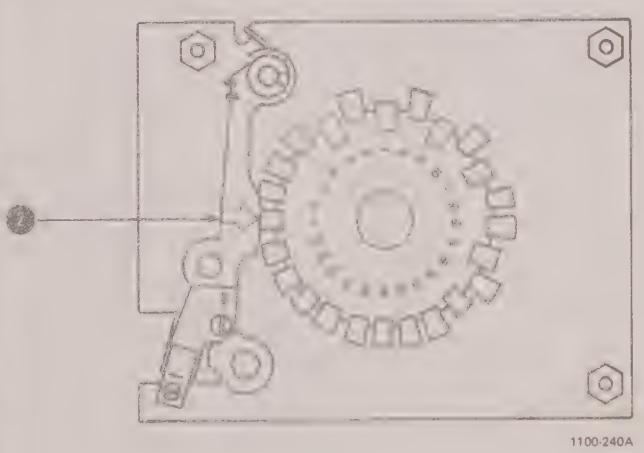


Figure 40 – Program Wheel and Mechanical Switch Lever

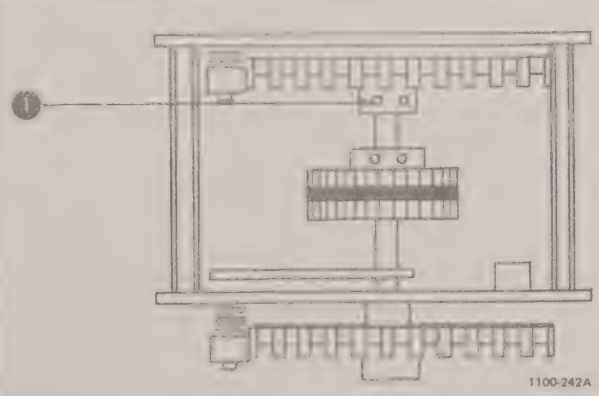


Figure 41 – Select-O-Range with Select-O-Print

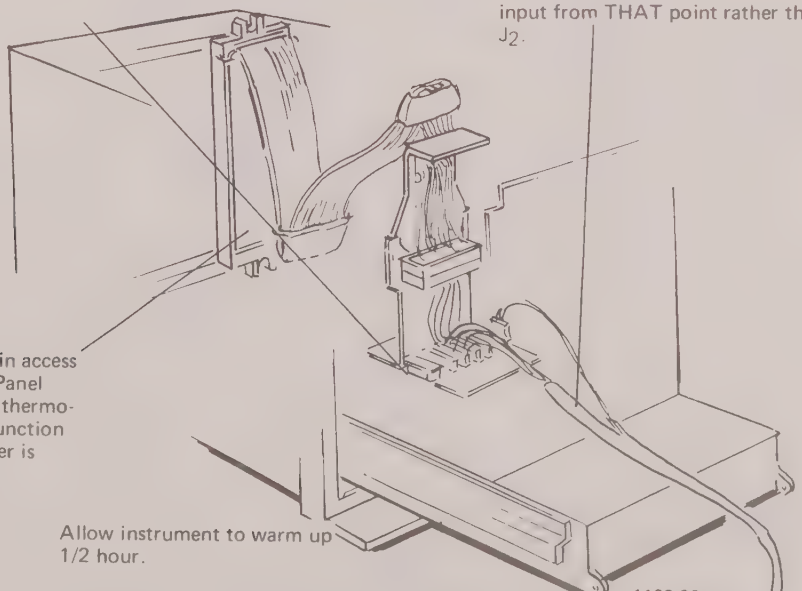
MILLIVOLT, RADIAMATIC*, AND OTHER UNCOMPENSATED ACTUATIONS

CAUTION: Dangerous stray voltages can exist. Before touching connections, turn off power and check each terminal with a multimeter. For best results check alignment of pointer, chart, etc., before calibrating. (See Service Manual 11-02-01.)

990-207-2

Disconnect NR1 or NR2 servo input cable from J2 connector board and connect calibration cable.

Calibration cable is supplied in accessory kit with terminals to fit connector board J_2. This permits calibrating from the front of the instrument. If necessary or more convenient, connect under screw heads at V_1 and V_3 on the Customer Terminal Panel, and disconnect input from THAT point rather than from J_2.

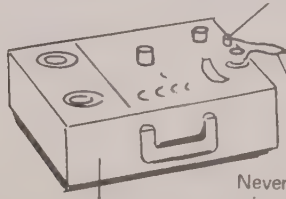


Place mercury thermometer in access hole on Customer Terminal Panel between V_1 and V_3, or tape thermometer directly to reference junction compensator block; whichever is easiest for you.

Allow instrument to warm up 1/2 hour.

1100-86

Observe polarity; V_1 is +, V_3 is −, attach shield to V_3.



If cable is lost, use twisted copper wire. Very narrow span millivolt actuations may require a two wire shielded cable. Only copper wires and shield are acceptable.

Never use clips or lugs, only bared wires.

Use precision voltage source such as a portable potentiometer.

422-0011-110

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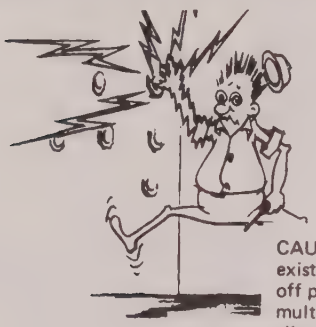
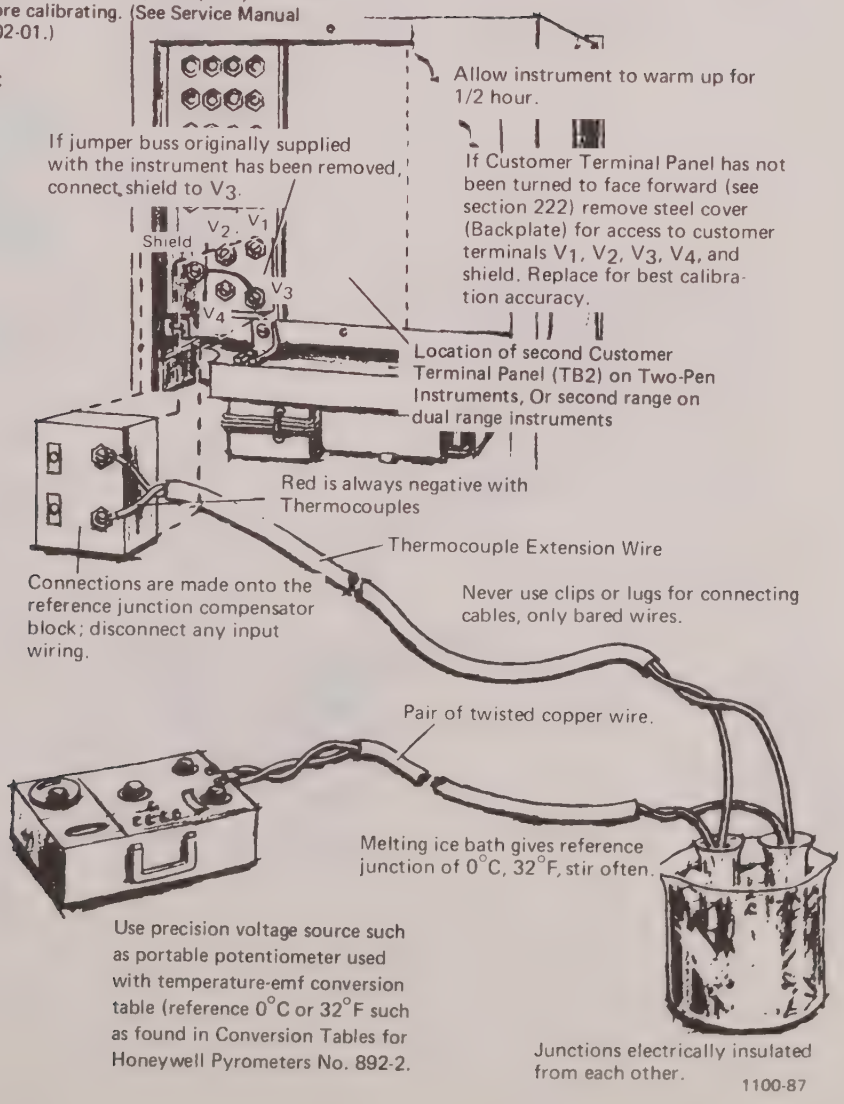
THERMOCOUPLE ACTUATED ONE & TWO PEN RECORDERS



CAUTION: Dangerous stray voltages can exist. Before touching connections, turn off power and check each terminal with a multimeter. For best results check alignment of pointer, chart, etc., before calibrating. (See Service Manual 11-02-01.)

MOST ACCURATE METHOD: using 0°C (32°F) reference


Allow instrument to warm up for 1/2 hour.
If jumper buss originally supplied with the instrument has been removed, connect shield to V3.
If Customer Terminal Panel has not been turned to face forward (see section 222) remove steel cover (Backplate) for access to customer terminals V1, V2, V3, V4, and shield. Replace for best calibration accuracy.
Shield
V2
V1
V3
V4
Location of second Customer Terminal Panel (TB2) on Two-Pen Instruments, Or second range on dual range instruments
Red is always negative with Thermocouples
Thermocouple Extension Wire
Connections are made onto the reference junction compensator block; disconnect any input wiring.
Never use clips or lugs for connecting cables, only bared wires.
Pair of twisted copper wire.
Melting ice bath gives reference junction of 0°C, 32°F, stir often.
Use precision voltage source such as portable potentiometer used with temperature-emf conversion table (reference 0°C or 32°F such as found in Conversion Tables for Honeywell Pyrometers No. 892-2.
Junctions electrically insulated from each other.
1100-87

422-0012-110

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Figure 1

THERMOCOUPLE ACTUATED ONE & TWO PEN RECORDERS

FIELD CALIBRATION: using ambient temperature reference.

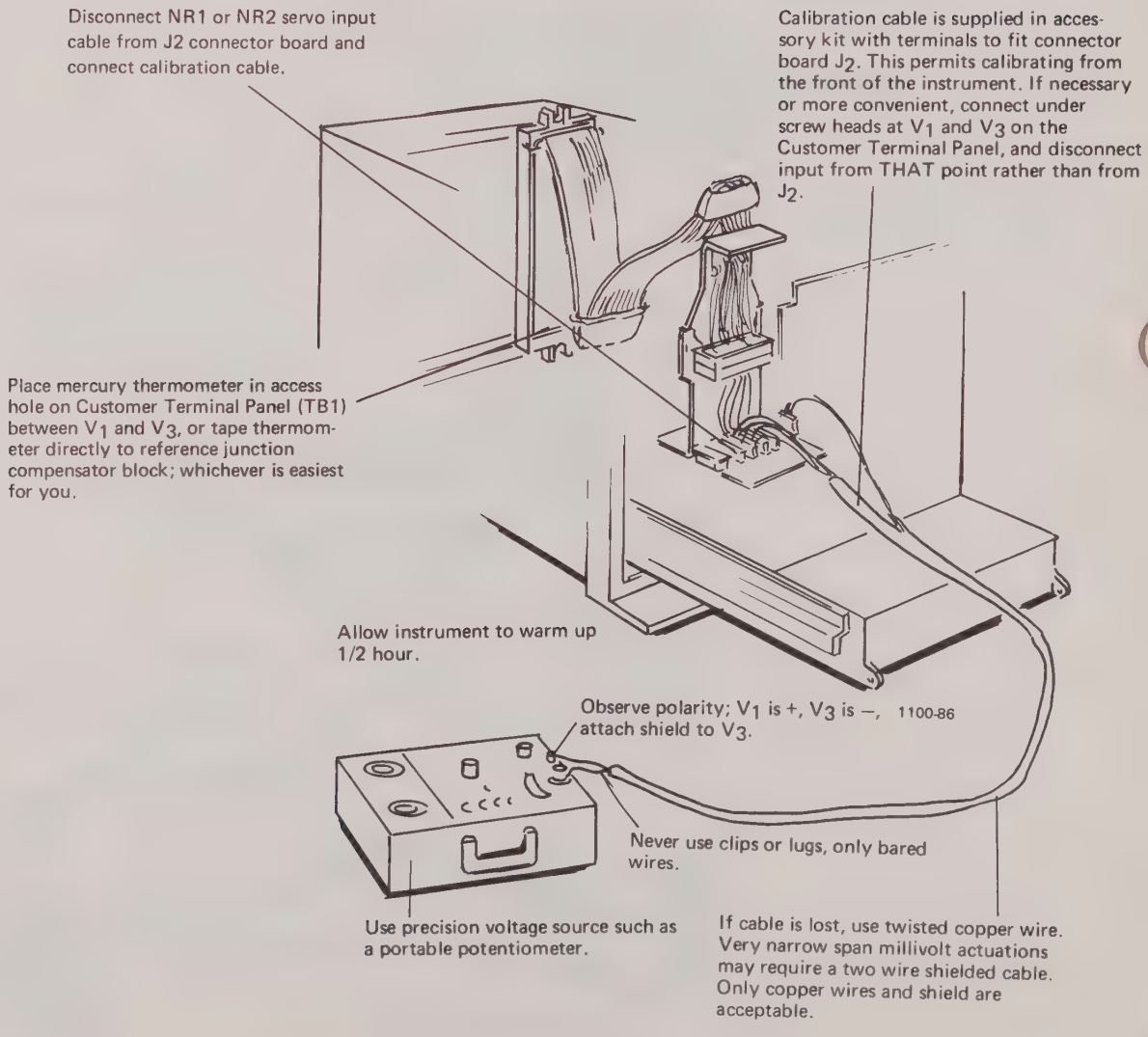
Disconnect NR1 or NR2 servo input cable from J2 connector board and connect calibration cable.
Calibration cable is supplied in accessory kit with terminals to fit connector board J_2. This permits calibrating from the front of the instrument. If necessary or more convenient, connect under screw heads at V_1 and V_3 on the Customer Terminal Panel, and disconnect input from THAT point rather than from J_2.
Place mercury thermometer in access hole on Customer Terminal Panel (TB1) between V_1 and V_3, or tape thermometer directly to reference junction compensator block; whichever is easiest for you.
Allow instrument to warm up 1/2 hour.
Observe polarity; V_1 is +, V_3 is −, attach shield to V_3.
1100-86
Never use clips or lugs, only bared wires.
Use precision voltage source such as a portable potentiometer.
If cable is lost, use twisted copper wire. Very narrow span millivolt actuations may require a two wire shielded cable. Only copper wires and shield are acceptable.

Figure 2

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THERMOCOUPLE ACTUATED MULTIPOINT STRIP CHART RECORDERS

The reference junction temperature compensator, on thermocouple actuated multipoint recorders, is a winding of copper wire around the anodized aluminum center section of the process input terminal panel TB3. See Figure 3.

The aluminum block provides equal ambient temperatures from Point 1 through Point 24. This temperature reference winding is then connected to terminal panel TB1 by a 2-wire cable; white/green to V4 and white/gray to V2. From TB1, it is then routed to instrument measuring circuit unit.

WIRING, MULTIPOINT RECORDERS

Method "A" (Suggested)

Connect a thermocouple compensated extension wire (iron/constantan or chromel/alumel, etc.) from selected thermocouple input terminals of TB3 to portable test pot. See Figure 3. The negative lead of the extension wire is color coded red. The reference junction is now at the portable test box; measure the reference junction temperature there with a mercury in glass thermometer.

Method "B" (Alternate)

Connect two plain copper wires from the portable test pot to the selected process input terminals of TB3. The reference junction is now at terminal board TB3 and there are a few ways to determine the reference junction temperature. (1) At the back of the case, tape a mercury in glass thermometer across the top of terminal board TB3 with bulb end at Point No. 1, or (2) if calibration check must be performed on a point other than No. 1, tape the thermometer to the terminal block at or close to the point being checked. (3) From inside the instrument case, locate the metal knockout plug at the center of terminal block TB3. Remove plug and place the bulb end of mercury thermometer in this hole.

Method "C" (Preferred)

The ice bath is the most accurate method of calibrating thermocouple actuated instruments. See Figure 4 and connect two copper wires to thermocouple extension wire and put the two junctions in an ice bath. Connect the other two ends of thermocouple extension wire to TB3.

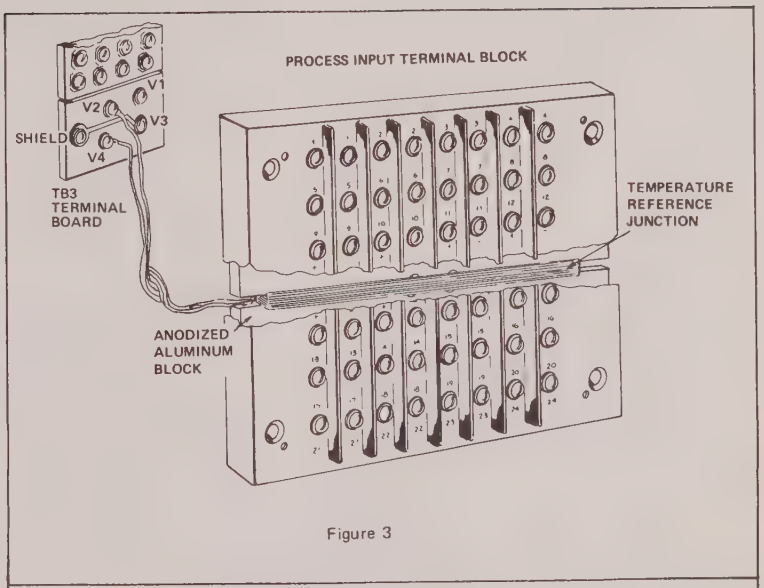


Figure 3

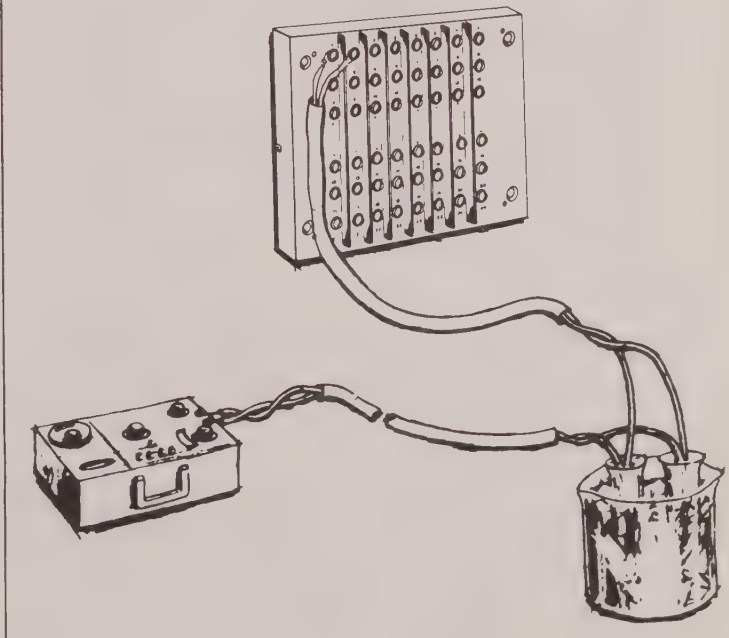
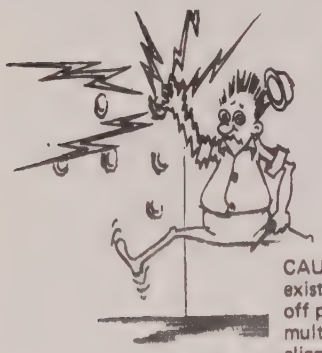


Figure 4

D-C CURRENT ACTUATION



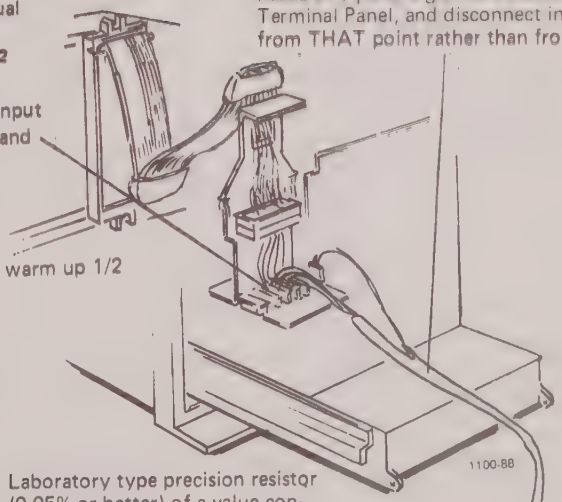
CAUTION: Dangerous stray voltages can exist. Before touching connections, turn off power and check each terminal with a multimeter. For best results check alignment of pointer, chart, etc., before calibrating. (See Service Manual 11-02-01.)

990-207-2

Calibration cable is supplied in accessory kit with terminals to fit connector board J_2. This permits calibrating from the front of the instrument. If necessary or more convenient, connect under screw heads at V_1 and V_3 on the Customer Terminal Panel, and disconnect input from THAT point rather than from J_2.

Disconnect NR1 or NR2 servo input cable from J2 connector board and connect calibration cable.

Allow instrument to warm up 1/2 hour.



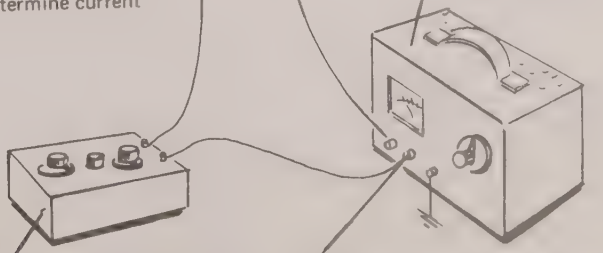
1100-88

Laboratory type precision resistor (0.05% or better) of a value convenient for span of instrument.

If cable is lost, use twisted copper wire. Very narrow span or microamp actuations may require a two wire shielded cable. Only copper wires and shield are acceptable. Connect SHIELD to V_3.

Use precision potentiometer, to read voltage drop across resistor. Attach as close to resistor as practical. Do not use clips or lugs, only bared wires. Use Ohm's Low to determine current flow.

d-c laboratory bench supply



Determine resistance necessary to supply proper range of current for your particular instrument. Adjust to this resistance on a precision decade resistance box BEFORE turning on d-c power supply.

(Same as instrument ground)

Observe polarity: V_1 is +, V_3 is -.

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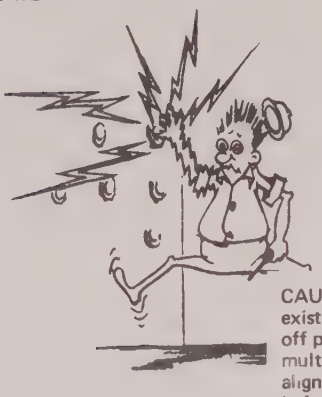
D-C VOLTAGE AND TACHOMETER ACTUATIONS



CAUTION: Dangerous stray voltages can exist. Before touching connections, turn off power and check each terminal with a multimeter. For best results check alignment of pointer, chart, etc., before calibrating. (See Service Manual 11-02-01.)

990-207-2

Disconnect NR1 or NR2 servo input cable from J2 connector board and connect calibration cable.

Calibration cable is supplied in accessory kit with terminals to fit connector board J_2. This permits calibrating from the front of the instrument. If necessary or more convenient, connect under screw heads at V_1 and V_3 on the Customer Terminal Panel, and disconnect input from THAT point rather than from J_2.

Allow instrument to warm up 1/2 hour.

Use precision potentiometer to read voltage drop across resistor. Attach as close to resistor as practical. Do not use clips or lugs, only bared wires.

1100-90

If cable is lost, use twisted copper wire. Very narrow span millivolt actuations may require a two wire shielded cable. Only copper wires and shield are acceptable. Connect SHIELD to V_3.

Construct a voltage divider using laboratory type precision resistors (0.05% or better) with values appropriate for your instrument span. This will permit you to read on the precision potentiometer a convenient proportion of the total input voltage.

d-c laboratory bench supply

Observe polarity: V_1 is +, V_3 is −.

(Same as instrument ground)

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Process Multipoint Recorder Model 111, 112

Calibration Procedures

Introduction

This instrument was inspected, adjusted, and calibrated before it left the factory. While instrument is ready for use, the following adjustments may be necessary from time to time.

Calibration Preparation

Primary Checks

Check alignment of indicating pointer. Drive pointer downscale and note the point on the scale at which it drives against the stop. Drive pointer upscale and do likewise. These noted check points should be equidistant from the stops at zero and one hundred percent of scale. If they aren't, loosen the screws where the drive scale is connected to the carriage assembly and realign the pointer.

Switch on the chart and print drive mechanism. When the selector switch arrives at the point/record that is to be calibrated, turn off the chart and print drive switch. This will cut out the print mechanism but still permit the carriage assembly to be driven up or downscale by the servo drive motor. Disconnect the thermocouple input leads of this point/record from terminal board TB3 at rear of the case. Connect a precision voltage source, such as J. G. Biddle Co. "Versapot" or similar portable potentiometer, to these two input terminals. Check for correct polarity which is indicated on terminal board TB3. The negative lead of extension wire is color coded red. The instrument servo and measuring circuit will now respond to this one input only. Any variable input from the portable test potentiometer will drive the indicating pointer up or downscale.

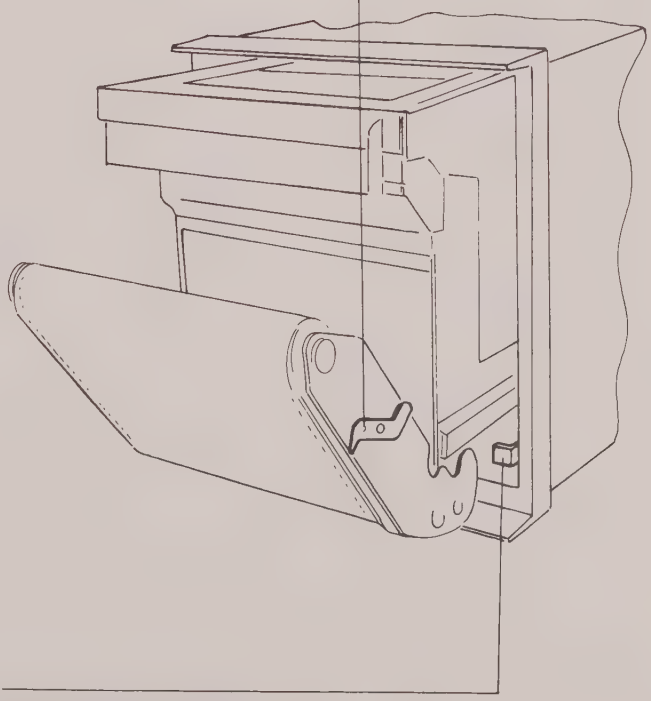
2
Release latch on both sides of the chart transport and remove chart transport.
Switch on instrument power and allow a warm up period of 30 minutes.
1
Open instrument door, release latch and pull out the chassis.

Figure 1

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Reference Junction (thermocouple)
The reference junction temperature compensator, on thermocouple actuated multipoint recorders, is a winding of copper wire around the anodized aluminum center section of the process input terminal panel TB3 (Figure 2).

The aluminum block provides equal ambient temperatures from Point 1 through Point 24. This temperature reference winding is then connected to terminal panel TB1 by a 2-wire cable; white/green to V4 and white/grey to V2. From TB1, it is then routed to instrument measuring circuit unit.

Check Deadband

1. Set the amplifier gain adjust in full clockwise position (Figure 3). Supply an input signal to the recorder and adjust amplifier gain until pointer stops oscillating.
2. Set the stepping switch of the portable pot to a millivolt output equal to 50% of range span. Note the position of pointer on scale. Turn the stepping switch to drive pointer upscale and slowly return it to its original set millivolt position. Note the position of the pointer on scale. If the difference between the two points (deadband) exceeds 0.1%, increase amplifier gain (clockwise adjustment). Deadband should not be adjusted below 0.1%, since it may increase the instrument's susceptibility to electrical noise signals (Figure 4).
3. With the stepping switch still set at 50% of range span, drive the pointer downscale and return it to its original set millivolt position. Note the position of pointer on scale. Deadband should not be less than 0.1% of full scale.

Calibration
After wiring the instrument to a portable test pot as described in a previous "Calibration Preparation" section, allow the instrument a short warm up period.

1. Determine the calibration check points at 10%, 50% and 100% of range span or the nearest cardinal point on instrument scale close to these reference points.
2. Refer to conversion table of Temperature Vs. EMF (IPTS-68) or to Honeywell Manual 892-2 and determine the millivolt equivalents (EMF) of these temperature points.
3. Note the thermocouple reference junction temperature on the mercury in glass thermometer and determine the millivolt equivalent.
4. Algebraically, subtract the millivolt equivalent of thermocouple reference junction temperature from the 10%, 50% and 90% of span reference points.

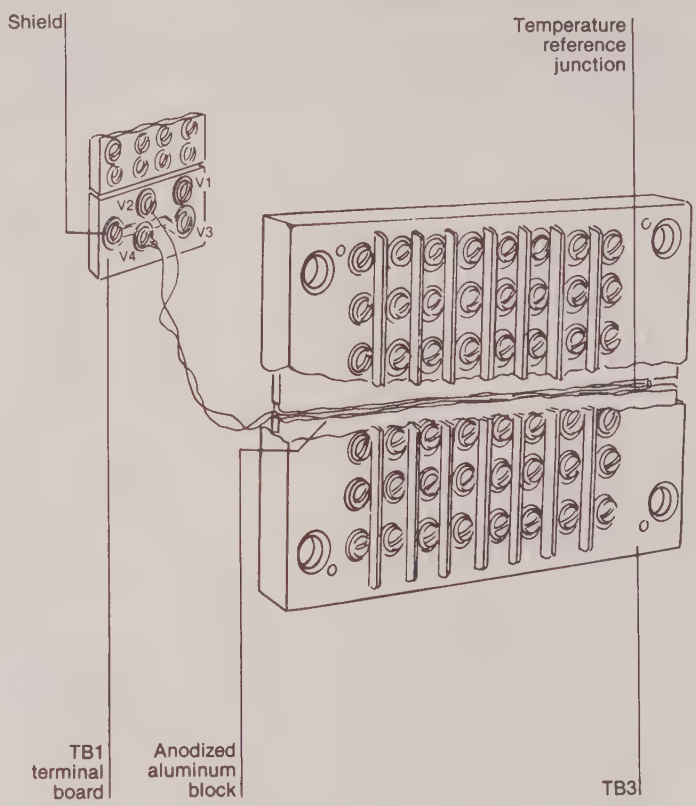

Figure 2 – Process input terminal block TB-3

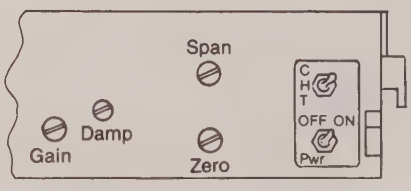

Figure 3 – Position of amplifier gain adjustment

REFERENCE JUNCTION TEMPERATURE 75°F OR 1.22 mV

% Span	Temp.	EMF	mV Inputs
10%	100°	1.942 mV	0.722
50%	500°	14.108 mV	12.888
90%	900°	26.396 mV	25.176

5. Supply an input signal from portable pot to recorder equal to 10% of scale. If pointer is not at 10%, adjust zero pot until it is (Figure 3).
6. Supply an input signal equal to 90% of scale. If pointer is not at 90%, adjust span pot until it is (Figure 3).
7. Repeat steps 5 and 6 until calibration is within ±0.3% of range span.

Burnout Can Cause Zero Shift

Some Millivolt, thermocouple, and Radiamatic actuations can have a "burnout" option. In model 111 and 112 potentiometers with burnout, the resistor burnout signal causes the pen to drive to one end of the scale should the input circuit open. The burnout signal is superimposed on the input signal and causes an offset from zero. Readjusting zero will compensate for this offset.

The magnitude of the zero offset caused by the burnout signal current flowing through the external circuit (source) resistance depends on two factors: (1) instrument span, and (2) external and/or the higher the external resistance, the greater the zero offset.

In calibrating those instruments having burnout, a difference in the resistance between the calibration equipment and the actual input source (e.g., thermocouple and extension wires) can introduce a zero offset error proportional to the magnitude of the difference in resistance. Portable laboratory potentiometers normally used for such calibration do not have a fixed output resistance. The resistance at the output terminals varies depending upon the millivolt setting. Such differences within the instrument range create difference in zero offset at the calibration points due to burnout. The difference in zero offset may be significant with narrow spans or with portable potentiometers having high internal resistance.

Calibration with Burnout

Method A

Accurate calibration can be obtained with this method regardless of the variations in resistance of the precision voltage source (usually a portable potentiometer) used for calibration.

1. Check and/or adjust the amplifier for optimum sensitivity.
2. Connect a precision voltage source as shown in the CALIBRATION PREPARATION section. If a commercial run up box* is used, be sure that it is a type having a fixed resistance of 100 ohms or less at the output terminals. If a fixed resistance type is unavailable, then one may be constructed as shown Figure 5.

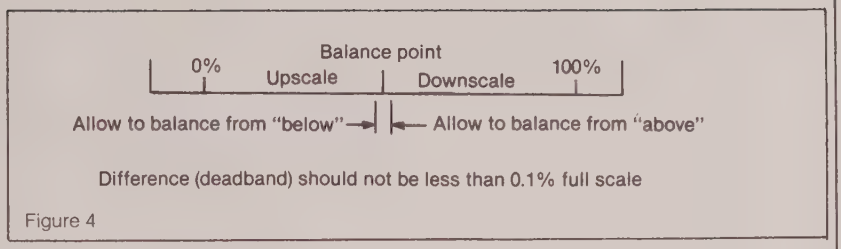

Figure 4

3. Temporarily connect a millivolt laboratory potentiometer and adjust the precision voltage source to a desired value.
4. Disconnect the millivolt laboratory potentiometer and proceed with calibration as described above for instruments without burnout.
5. When completed, use this precision voltage source to supply a signal to cause the instrument to read at some convenient point on scale. Note that point.
6. Now add in series with this precision voltage source, a resistance equal to that of the external circuit normally connected to the instrument (add the resistance of the sensing unit and connecting wires). This will most likely cause a zero shift in the same reading (taken in step 5).
7. Adjust instrument zero to read again the value noted in step 5.
8. Remove all calibration equipment.
9. The instrument is now calibrated and adjusted for the burnout resistance.

Method B

This method partially compensates for variations in zero shift within the instrument range caused by differences of internal resistance between dial settings of the precision voltage source (usually a portable potentiometer). With wider instrument spans or lower resistance of the calibration potentiometer (precision voltage source), inaccuracy due to zero shift may be negligible.

1. Adjust amplifier gain for optimum sensitivity.
2. Connect the precision voltage source as shown in the CALIBRATION PREPARATION section. Set it for a value equivalent to the approximate midpoint of the instrument range.
3. Disconnect the battery from the precision voltage source, measure and note the resistance of the output terminals of the calibration setup.
4. Reconnect the battery and calibrate as described above for instruments without burnout.
5. When completed, use the precision voltage source to supply a signal to cause the instrument to read approximately the midpoint of scale. Note the value.

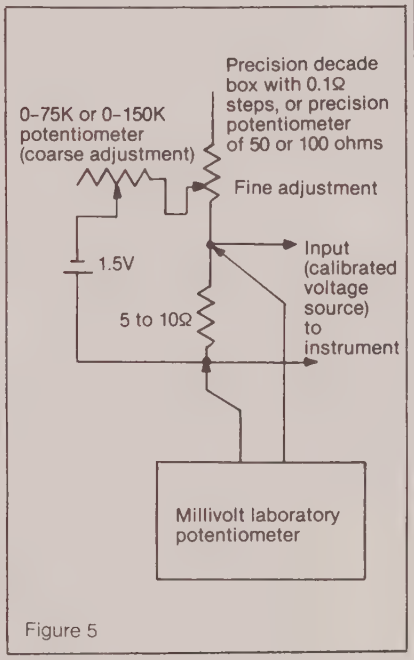
Precision decade box with 0.1Ω steps, or precision potentiometer of 50 or 100 ohms
0-75K or 0-150K potentiometer (coarse adjustment)
Fine adjustment
1.5V
Input (calibrated voltage source) to instrument
5 to 10Ω
Millivolt laboratory potentiometer

Figure 5

6. Measure the resistance of the external circuit normally connected to the instrument (sensing unit and connecting wires). Find the difference between this resistance and the resistance of the calibration setup as found in step 3.
7. Add a resistance approximately equal to this difference (step 6) in series with the calibration setup. Note the amount of offset compared to reading in step 5.
8. Remove series resistance and allow instrument to return to midpoint reading observed in step 5.
9. To correct for offset, adjust instrument zero from reading observed in step 5 by an amount equal to the offset:

   If resistance of external circuit is higher than that of calibration setup, shift zero downscale.

   If resistance of external circuit is lower than that of calibrating setup, shift zero upscale.
10. Remove all calibration equipment.
11. The instrument is now calibrated and adjusted for burnout resistance.

Dual Range/Select-O-Range

On dual range and Select-O-Range recorders, zero and span adjustments are available for each range. The adjustments for range one (identified by red dot on chassis) are on the servo amplifier located directly under the chassis on the model 111 (Figure 6) and on the right side of the recorder under the chassis on the model 112 (Figure 7).

The adjustments for range 2 (purple dot) are on the dual range/Select-O-Range amplifier located under the servo amplifier on the model 111 (Figure 6) and on the left side of the chassis on the model 112 (Figure 7).

On dual range recorders (Option 211 and 214) range selection is determined by a switch on the front of the chassis. (Refer to operation section 310-74.)

On recorders with Select-O-Range (Option 212 and 215) range selection is determined by a program wheel located behind the selector switch. (Refer to operation section 310-74.)

NOTE: ON DUAL RANGE/SELECT-O-RANGE RECORDERS, RANGE 1 MUST BE CALIBRATED BEFORE RANGE 2.

Use the calibration procedure on page 2 for each amplifier.

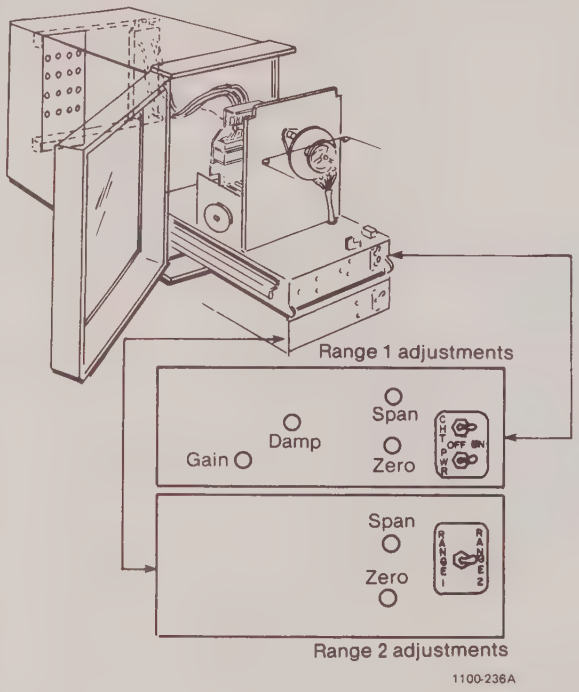

Figure 6 – Model 111

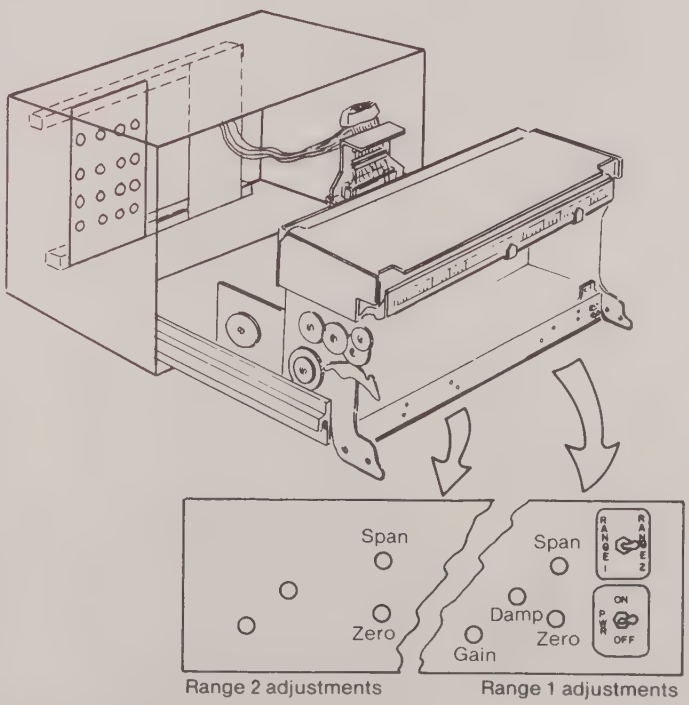

Figure 7 – Model 112

Honeywell

Model 111 & 112 Process Multipoint Package

Parts List

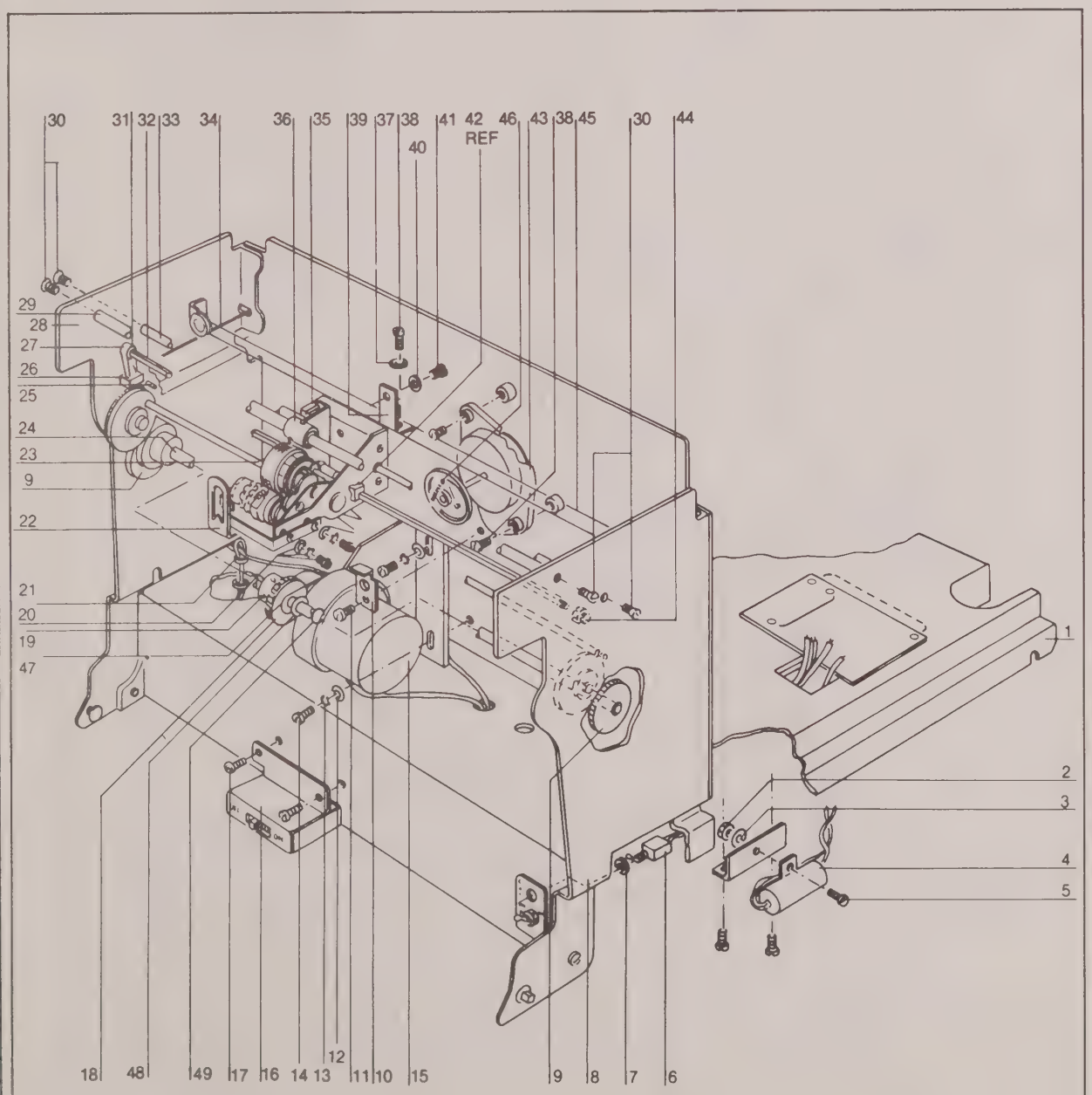

Figure 1 – Front of chassis

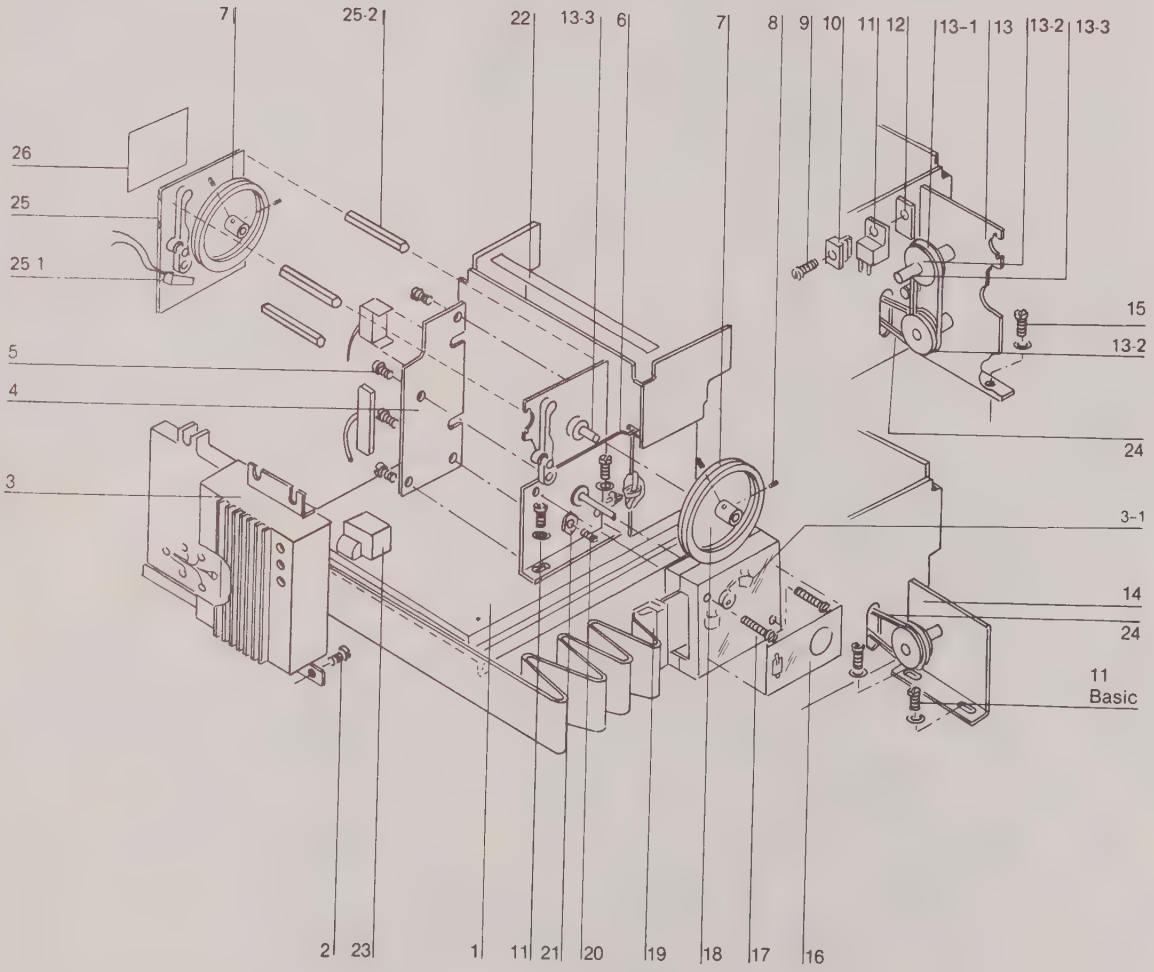

Figure 2 – Rear of chassis

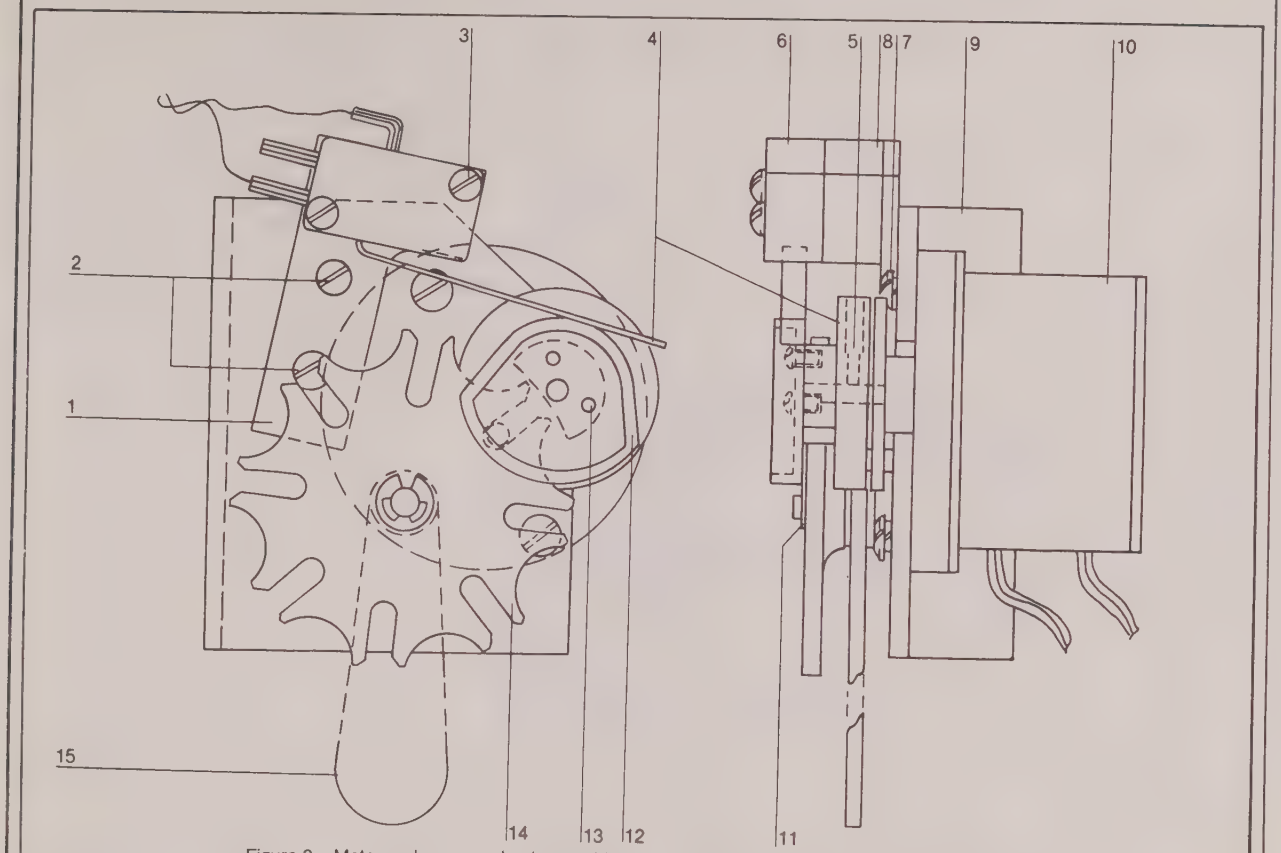

Figure 3 – Motor and geneva wheel assembly, basic multipoint and fixed print cycle select-o-print

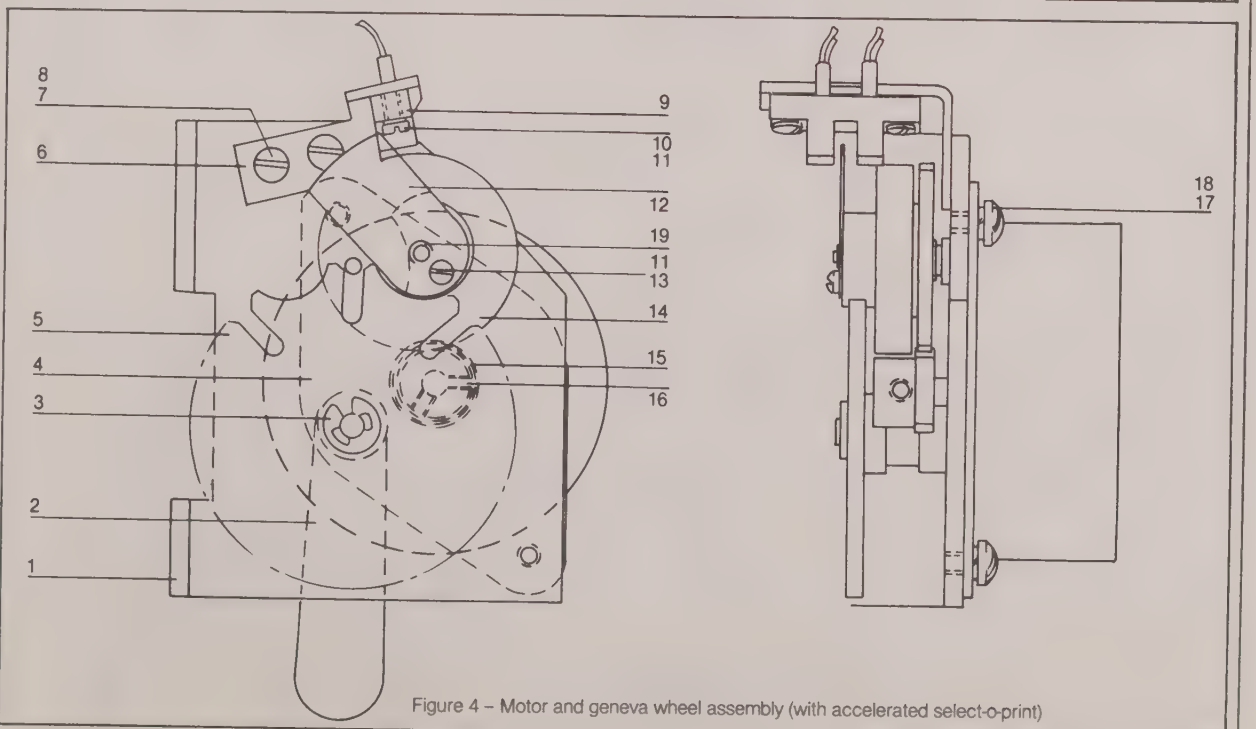

Figure 4 – Motor and geneva wheel assembly (with accelerated select-o-print)

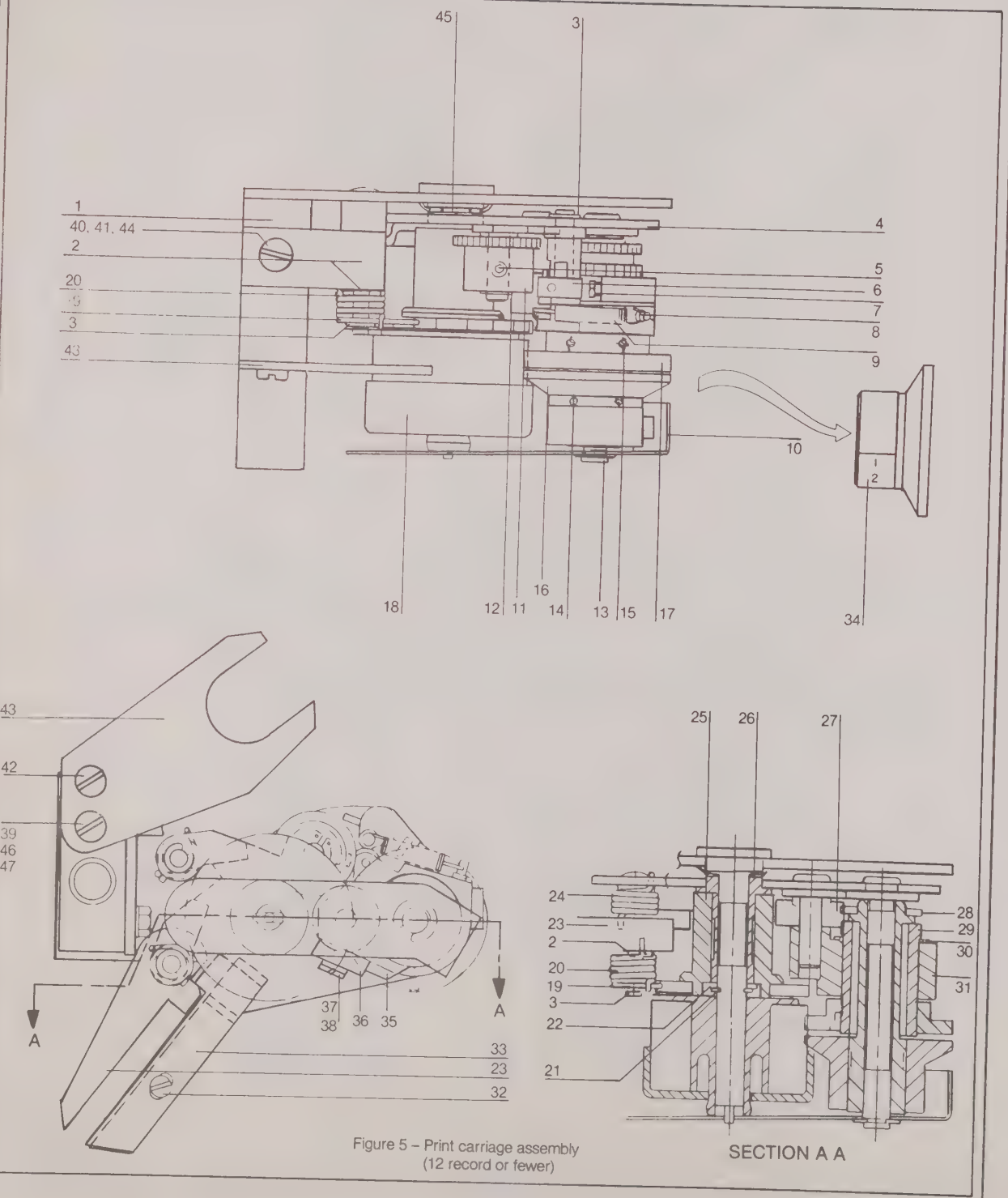

Figure 5 – Print carriage assembly
(12 record or fewer)

SECTION A A

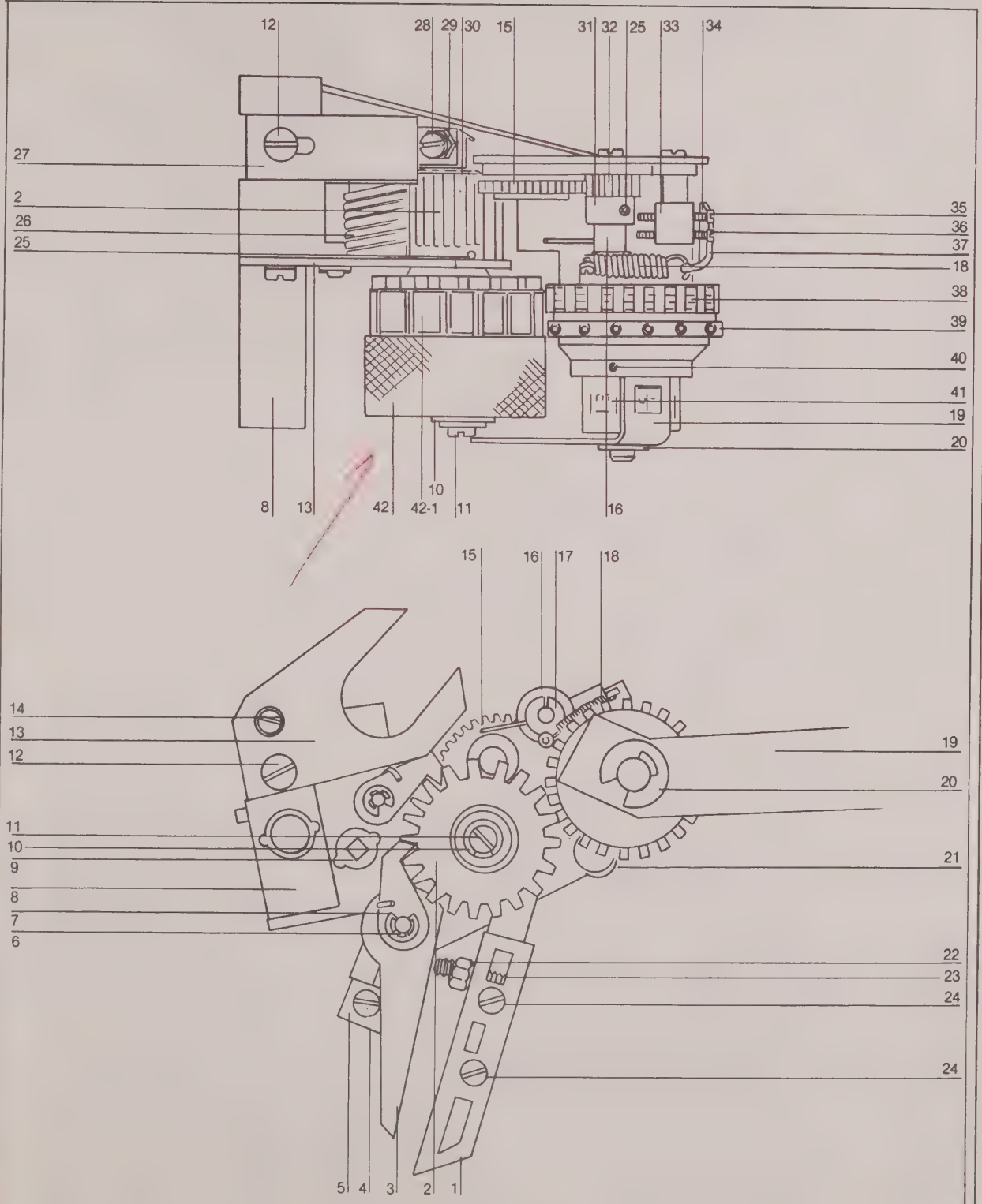

Figure 6. Print Carriage Assembly
(24 Record)

FIGURE NO. 1

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit 111	Quantity Unit 112	Kit
1	See Section 716	chassis subassembly			1	1	
2	(K) 30734970-†	nut			1	1	6
3	30000930-000*	lockwasher .115 ID x .162 OD x .031 wall			1	1	
4	30677498-004	capacitor assembly			1	1	
5	30000005-404*	screw 4-40 bdg. hd. 1/4''			1	1	
6	30676832-005	switch assembly			1		
7	(K) 30734970-†	lockwasher			1	6	
8	See Section 753-	Right hand side plate assembly			1	1	
9	30679870-001 (K) 30734970-†	gear assembly 45 teeth set screw			1 1	1	6 3
10	30679008-001	stop			2	2	1
11	30000012-804*	screw 8-32, flt. head 1/4''			1	1	
12	30364998-000*	washer (without Select-O-Print)			1	1	
13	(K) 30734970-† 30009771-000*	lockwasher (without Select-O-Print) lockwasher (with Select-O-Print)			1 1	1 1	6
14	30000005-806*	screw 8-32, bdg. hd 3/8''			1	1	
15	See Figure 3	motor and geneva			1	1	
16	30682332-002	switch assembly – on/off				1	
17	30000005-805*	screw 8-32 bdg. hd. steel 5/16''			1	1	
18	30679870-002	gear assembly 45T			1	1	
19	(K) 30734970-†	set screw			1	1	3
20	30002273-000* 30005900-000* 30006581-000*	screw 2-56, bdg. hd. steel 1/8'' washer 0.25 OD x .089 ID x .016 wall lockwasher .123 OD x .088 ID x .020 wall			1 1 1	1 1 1	
21	30371564-912	plastic tie			1	1	1
22	(K) 30734970-† 30751584-001 30751589-001	pointer (without Select-O-Range/Dual Range) pointer (with Select-O-Range/Dual Range) mounting bracket for Select-O-Range/Dual Range pointer			1 1 1	1 1 1	1
23	30679869-001 30679869-002	actuating rod actuating rod			1	1	
24	(K) 30734970-001 (K) 30734970-002	shaft shaft			1	1	1 1
25	(K) 30735475-001	set screw (with Select-O-Print)			1	1	1
26	(K) 30735475-001	bracket and pin assembly (with Select-O-Print)			1	1	1
27	(K) 30735475-001	lever (with Select-O-Print)			1	1	1
28	See Section 753-	left hand side plate			1	1	
29	30676708-003 30676708-004 30682271-002 30682271-003	carriage rod carriage rod (set point) carriage rod carriage rod (set point)			1 1	1 1	

FIGURE NO. 1

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit 111	Quantity Unit 112	Kit
30	30000012–404*	screw 4–40 flathead, 1/4"			1	1	
31	(K) 30735475–001	external cotter (with Select-O-Print)			1	1	1
32	30735029–001 30735029–002	square shaft (with Select-O-Print) square shaft (with Select-O-Print)			1	 1	
33	30676708–002 30682271–001	carriage rod carriage rod			1	 1	
34	30735027–001	wire link (with Select-O-Print)			1	1	
35	See Figures 5 and 6	print carriage assembly			1	1	
36	30679967–001	bearing assembly			1	1	
37	30042081–000* (K) 30734970–002	washer .130 ID x .25 OD x .0312 THK cable clamp			1	 1	 6
38	30000005–403*	screw 4–40 bdg. hd. 3/16"			1	1	
39	(K) 30734970–001 (K) 30734970–002	bracket bracket			1	 1	1 1
40	(K) 30734970–†	lockwasher			1	1	6
41	30000005–007*	screw 10–32 bdg. hd. 7/16"			1	1	
42	30735028–001	cam (Select-O-Print)			1	1	
43	(K) 30734970–†	slidewire cover			1	1	1
44	(K) 30735475–001	bearing (Select-O-Print)			1	1	1
45	30676862–001 30676862–008	cable (1117) cable (1127)			1	 1	
46	(K) 30734970–001 (K) 30734970–002	spring spring			1	 1	
47	30735518–001	clutch for geneva drive			1	1	
48	30001942–000	flat washer			1	1	
49	30364124–000	retaining ring			1	1	

†parts supplied in Kits 30734970–001 and 30734970–002

FIGURE NO. 2

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Quantity 111	Quantity Quantity 112	Kit
1	See Section 716	chassis subassembly			1	1	
2	30000005–805*	screw 8–32, bdg. hd, 5/16"			1	1	
3	30735542–503	terminal panel assembly, T/C actuation (12 record or fewer)			1	1	
	30735542–501	terminal panel assembly, T/C actuation (24 records)			1	1	
	30735542–505	terminal panel assembly, MV actuation (24 records)			1	1	

FIGURE NO. 2

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity Unit		
			10	100	111	12	Kit
3	30735542-507	terminal panel assembly, MV actuation (12 records or fewer)			1	1	
	30735544-501	terminal panel assembly, RTB (12 records)			1	1	
	30735544-502	terminal panel assembly, RTB (6 records)			1	1	
	30735544-503	terminal panel assembly, RTB (3 records)			1	1	
	30735544-504	terminal panel assembly, RTB (2 records)			1	1	
	30735544-505	terminal panel assembly, RTB (4 records)			1	1	
	30735543-501	terminal panel assembly, Dc Current (12 records)			1	1	
	30735543-502	terminal panel assembly, Dc Current (6 records)			1	1	
	30735543-503	terminal panel assembly, Dc Current (3 records)			1	1	
	30735543-504	terminal panel assembly, Dc Current (2 records)			1	1	
	30735543-505	terminal panel assembly, Dc Current (4 records)			1	1	
3-1	See Table 2	rotor and wiper assembly	1	3	2	2	
4	30735438-001	P.C. board assembly (accelerated (Select-O-Print)			1	1	
5	30000005-403*	screw 4-40, bdg. hd. 3/16'' (Select-O-Print)			4	4	
6	(K) 30735475-001	wire link (Select-O-Print)			1	1	1
7	30734873-001	program wheel (Select-O-Print and/or Select-O-Range)			1/2	1/2	
8	30040857-002	set screw (Select-O-Print)			2	2	
9	30000005-406*	screw 4-40, bdg. hd., 3/8''			1	1	
10	30733975-001**	spacer			1	1	
11	30736394-001	Triac assembly (accelerated Select-O-Print)			1	1	
12	30732117-006**	insulator (accelerated Select-O-Print)			1	1	
13	30734868-001	programmer (with Select-O-Print without Select-O-Range)			1	1	
	30734868-002	programmer (with Select-O-Print with Select-O-Range)			1	1	
	30734868-003	programmer (Select-O-Range without Select-O-Print)			1	1	
13-1	30735176-001	gear belt (Select-O-Print)	1	2	1	1	
13-2	30735486-001	pulley			2	2	
13-3	30734878-001	shaft (without Select-O-Range)			1	1	
	30751518-001	shaft (with Select-O-Range)			1	1	
14	30679886-001	shaft & pulley (w/o Select-O-Print)			1	1	
15	30000005-806*	screw 8-32, bdg. head, 3/8''			1	1	
16	30736025-002	instruction plate (fixed print cycle Select-O-Print)			1	1	
	30736025-001	instruction plate (accelerated Select-O-Print)			1	1	
17	30000005-632*	screw 6-32, bd. hd., 2''			1	1	
18	30734906-TAB	number disc (Select-O-Print)			1	1	
19	30679160-001	shorting connector assembly (2 records)			1	1	
	30679160-002	shorting connector assembly (3 records)			1	1	
	30679160-003	shorting connector assembly (6 records)			1	1	
	30679160-004	shorting connector assembly (4 records)			1	1	
20	(K) 30734970-†	set screw			1	1	3

FIGURE NO. 2

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit 111	Quantity Unit 12	Quantity Kit
21	(K) 30735475-001	bearing			1	1	1
22	30736390-000	instruction plate (accelerated Select-O-Print)			1	1	
23	30735485-002	transformer (accelerated Select-O-Print)			1	1	
24	30687537-505	gear belt	1	2	1	1	
25	30751591-001	mechanical switch assembly (Select-O-Range)			1	1	
25-1	30751586-501	switch and cable assembly (Select-O-Range)			1	1	
25-2	30732572-002	mounting post			1	1	
26	30751587-001	range instruction plate			1	1	

†Parts supplied in Kits 30734970-001 and 30734970-002
**Part of 30736394-001 trial assembly

FIGURE NO. 3

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30679901-007	motor and geneva wheel assembly (4 RPM motor output)			1	
	30679901-008	motor and geneva wheel assembly (12 RPM motor output)			1	
	30679901-009	motor and geneva wheel assembly (with timing switch – 4 RPM motor output)			1	
	30679901-010	motor and geneva wheel assembly (with timing switch – 12 RPM motor output)			1	
	30679901-011	motor and geneva wheel assembly (30 RPM motor output)			1	
	30679901-012	motor and geneva wheel assembly (with timing switch – 30 RPM motor output)			1	
1	(K) 30734970-†	bracket			1	1
2	(K) 30734970-†	screw			2	2
3	30000005-414*	screw 4-40, bd. hd., 7/8''			2	
4	30735533-002 30735533-003	geneva drive assembly (without timing switch) geneva drive assembly (with timing switch)			1 1	
5	(K) 30734970-†	set screw			1	3
6	30679849-002	switch assembly			1	
7	30720004-606 30006583-000*	screw lockwasher .141 ID x .188 OD x .031 wall			2 2	
8	(K) 30734970-† (K) 30734970-†	timing switch spacer (without timing switch)			1 1	1 1
9	30679872-001	plate assembly			1	
10	30679475-004 30679475-005 30679475-006	motor assembly (4 RPM) motor assembly (12 RPM) motor assembly (30 RPM)	0 0 0	1 1 1	1 1 1	
11	(K) 30734970-†	retaining ring			1	4
12	(K) 30734970-† (K) 30734970-†	cam (non Select-O-Print) cam (Select-O-Print)			1 1	1 1

FIGURE NO. 3

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity	
			10	100	Unit	Kit
13	30005900–000* 30006581–000* 30000005–230*	washer lockwasher .123 OD x .088 ID x .020 wall screw 2–56, bd. hd., 3/16"			2 2 2	
14	(K) 30734970–†	geneva wheel			1	1
15	30687537–505	gear belt	1	2	1	

†Parts supplied in kits 30734970–001 and 30734970–002

FIGURE NO. 4

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity	
			10	100	Unit	Kit
	30735137-501	motor and geneva wheel assembly (with accelerated Select-O-Print)			1	
1	30735403–001	plate assembly			1	
2	30687537–505	gear belt	1	2	1	
3	30371539–206	retaining ring			1	
4	30735506-501	motor assembly	0	1	1	
5	(K) 30734970–†	geneva wheel			1	1
6	(K) 30734970–†	bracket			1	1
7	30000005–404*	screw 4–40, bd. hd. 1/4"			2	
8	30000930–000*	lockwasher .115 ID x .209 OD x .031 wall			2	
9	30735535-501	switch assembly			1	
10	30000005–205*	screw 2–56, bd. hd. 5/16"			2	
11	30006581–000*	lockwasher .088 ID x .158 OD x .020 wall			3	
12	(K) 30734970–†	arm			1	1
13	30000005–203*	screw 2–56, bd. hd. 3/16"			1	
14	30735533–001	geneva drive and 60T gear assembly			1	
15	30735504–001	gear 24T			1	
16	(K) 30734970–†	set screw			1	1
17	30000005–604*	screw 6–32, bd. hd. 1/4"			2	
18	30006583–000*	lockwasher .141 ID x .235 OD x .031 wall			2	
19	(K) 30734970–†	retaining ring			1	1

†Parts supplied in Kits 30734970–001 and 30734970–002

FIGURE NO. 5

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity	
			10	100	Unit	Kit
	30679480–item	print carriage assembly see Table 1			1	
1	30735428–002	block & plate assembly			1	
2	30735550–001	block and pin assembly			1	
3	30079208–000	external cotter			3	
4	30735014–002	plate assembly			1	
5	(K) 30734972–001	set screw			1	2
6	30679466–001	cam assembly			1	
7	(K) 30734972–001	screw hex hd.			1	1
8	(K) 30734972–001	post			1	1
9	(K) 30734972–001	spring			1	1
10	30735184–001	clip, ink wheel			1	
11	(K) 30734972–001	gear 26T			1	1
12	(K) 30734972–001	external cotter			1	2
13	(K) 30734972–001	external cotter			1	6
14	(K) 30734972–001	set screw			2	2
15	(K) 30734972–001	set screw			2	2
16	30679915–001	wheel, dot			1	
17	30679914-item	wheel, number (see Table 1)			1	
18	30679481-item	wheel, assembly, ink (see Table 1)			1	
19	30679993–001	pawl			2	
20	30736405–001 30736423–001	spring spacer			2 2	
21	(K) 30734972–001	retaining ring			1	3
22	(K) 30734972–001	spacer			1	3
23	(K) 30734972–001	lever			1	1
24	(K) 30734972–001	spring			1	1
25	30679854–001	gear & ratchet assembly			1	
26	(K) 30734972–001	washer			1	1
27	30679841–001	gear 20T			1	
28	30679856–001	gear & shaft			1	
29	(K) 30734972–001	gear 24T			1	1
30	(K) 30734972–001	spacer			1	1
31	30679859–001	block assembly			1	
32	30720004–205*	screw 2–56 bdg. hd. 1/8"			2	
33	(K) 30734972–001	bearing block			1	1

FIGURE NO. 5

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
34	(K) 30734973–001	indicator strip			1	1
35	(K) 30734972–001	detent			1	1
36	(K) 30734972–001	support plate			1	1
37	30006581–000	lockwasher			1	
38	30720004–203*	screw 2–56 bd. hd. 3/16"			1	
39	30720004–404*	screw 4–40, bd., hd. 1/4"			1	
40	30006538–000*	washer 0.130 ID x 0.25 OD x .014 wall			1	
41	30000927–000*	lockwasher 0.115 ID x .195 OD x .025 wall			1	
42	30720001–203*	screw 2–56, flat hd. 3/16"			1	
43	30735404–001	front bearing bracket			1	
44	30720004–406*	screw 4–40, bd. hd., 3/8"			1	
45	30007152–000	flat washer			1	
46	30360900–001	washer ext. tooth			1	
47	30002137–000	flat washer			1	

NOTE: Parts for Select-O-Print cam adjusting arm not shown. They are the same as shown on 24 record print carriage, Figure 6. Order parts by kit #30735474–001.

FIGURE NO. 6

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30735035–501 30735035–502	print carriage assembly (purple) print carriage assembly (6 color)			1 1	
1	(K) 30735473–001	bearing block			1	1
2	(K) 30735185–001	gear and ratchet assembly			1	1
3	(K) 30735473–001 30735014–001	print lever actuating plate assembly			1 1	1
4	(K) 30735474–001	cam adjusting arm			1	1
5	(K) 30735474–001 (K) 30735474–001	screw 2–56 bd. hd. 1/8" lockwasher			1 1	1 1
6	(K) 30735185–001	external cotter			2	2
7	(K) 30735185–001 (K) 30735185–001	pawl torsion spring			2 1	2 1
8	30735428–001	block and plate assembly			1	
9	(K) 30735474–001	cam			1	1
10	(K) 30735187–001	bearing			1	1
11	(K) 30735187–001	screw			1	1
12	30720004–404* (K) 30735188–001	screw 4–40, bd. hd. 5/16" washer			2 2	 1
13	30735404–001	front bearing bracket			1	

FIGURE NO. 6

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
14	(K) 30735188–001	screw 2–56, flat head, 3/16"			1	1
15	30734949–001	gear			1	
16	(K) 30735186–001	cam assembly – Select-O-Trend			1	1
17	(K) 30735186–001	spiral pin			1	1
18	(K) 30735188–001	extension spring			1	1
19	(K) 30735187–001	clip ink wheel			1	1
20	(K) 30735187–001	external cotter			1	1
21	(K) 30735188–001	torsion spring			1	1
	(K) 30735188–001	detent pawl assembly			1	1
	(K) 30735186–001	screw			1	2
22	(K) 30735473–001	nut			1	1
23	(K) 30735473–001	set screw			1	1
24	30720004–205	screw 2–56, bd. head, 5/16"			1	
25	(K) 30735186–001	set screw			4	2
26	(K) 30735185–001	pawl torsion spring			2	2
27	30735550–001	block and pin assembly			1	
28	(K) 30735474–001	screw			1	1
29	(K) 30735474–001	adjusting nut			1	1
30	(K) 30735187–001	friction washer			1	1
31	(K) 30735186–001	cam			1	1
	(K) 30735186–001	set screw			1	1
32	30734950–001	gear			1	
33	30736228–001	pivot block assembly			1	
34	(K) 30735186–001	nut			1	1
35	(K) 30735186–001	screw			1	1
36	(K) 30735186–001	screw			1	1
37	(K) 30735188–001	spring bracket			1	1
38	30735026–024	numeral print wheel			1	
	(K) 30735188–001	coupling			1	1
39	30735025–001	dot print wheel			1	
40	(K) 30735188–001	set screw			1	2
41	30735036–024	indicator strip			1	
42	30735426–501	ink wheel (purple)			1	
	30735426–506	ink wheel (6 color)			1	
42-1	30735591–001	ink pad – purple			1	
	30735591–002	ink pad – red			1	
	30735591–003	ink pad – black			1	
	30735591–004	ink pad – blue			1	
	30735591–005	ink pad – green			1	
	30735591–006	ink pad – brown			1	

TABLE ONE

Print Carriage Assembly		Number Wheel		Ink Wheel Assembly	
30679480–501	2 color, 2 Point	30679914–002	2 Point	30679481–501	1 color
30679480–502	3 color, 3 Point	30679914–003	3 Point	30679481–502	2 color
30679480–503	4 color, 4 Point	30679914–004	4 Point	30679481–503	3 color
30679480–504	6 color, 6 Point	30679914–006	6 Point	30679481–504	4 color
30679480–505	6 color, 12 Point	30679914–012	12 Point	30679481–506	6 color
30679480–006	single color, 2 point	30679914–002	2 point	30679481–501	purple
30679480–007	single color, 3 point	30679914–003	3 point	30679481–501	purple
30679480–008	single color, 4 point	30679914–004	4 point	30679481–501	purple
30679480–009	single color, 6 point	30679914–006	6 point	30679481–501	purple
30679480–010	single color, 12 point	30679914–012	12 point	30679481–501	purple

TABLE TWO

Used On	Selector Switch Wiper Part No.
T/C and mV – 24 records	30683742–001 30683743–001
T/C and mV – 12 records or fewer	30683742–002 30683743–002
RTB	30683742–002 30683743–003
dc current	30683742–002 30683743–002

Summary of Kit Contents

Figure No.	Key No.	Description	Kit 30734970–001 Qty.	Kit 30734970–002 Qty.
1	5	lockwasher	6	6
1	12	set screw	3	3
2	1	retaining ring	4	4
2	2	geneva wheel	1	1
1	17	washer	6	6
1	18	pointer	1	1
1	20	shaft	1	–
1	20	shaft	–	1
1	27	cable clamp	–	1
1	28	bracket	1	–
1	28	bracket	–	1
1	29	lockwasher	6	6
1	36	nut	6	6
1	41	lockwasher	6	6
1	32	stop	1	1
1	42	slidewire cover	1	1
1	34	spring	1	–
1	34	spring	–	1
2	10	bracket	1	1
2	11	screw	2	2
2	12	switch	1	1

Summary of Kit Contents

Kit 30734972-001

Figure No.	Key No.	Description	Qty.
3	5	set screw	2
	7	screw hex hd.	1
	8	post	1
	9	spring	1
	10	clip ink wheel	1
	12	external cotter	2
	13	external cotter	6
	14	set screw	2
	15	set screw	2
	20	spring	1
	21	retaining ring	3
	22	spacer	3
	23	lever	1
	24	spring	1
	26	washer	1
	29	gear 24T	1
	30	spacer	1
	33	bearing block	1
	35	detent	1
	36	support plate	1

Summary of Kit Contents

Kit 30734973-001

Figure No.	Key No.	Description	Qty.
3	34	indicator strip (2 point)	
	34	indicator strip (3 point)	
	34	indicator strip (4 point)	
	34	indicator strip (6 point)	
	34	indicator strip (12 point)	

Kit 30735185-001

Figure No.	Key No.	Description	Qty.
6	2	gear and ratchet	1
	6	external cotter	2
	7	pawl	2
	7	torsion spring	1
	26	pawl torsion spring	2

Kit 30735186-001

Figure No.	Key No.	Description	Qty.
6	16	cam assembly-Select-O-Trend	1
	17	spirol pin	1
	21	screw	2
	25	set screw	2
	31	cam	1
	31	set screw	1
	34	nut	1
	35	screw	1
	36	screw	1

Figure No.	Key No.	Kit 30735187-001 Description	Qty.
6	10	bearing	1
	11	screw	1
	19	inkwheel clip	1
	20	external cotter	1
	30	friction washer	1

Figure No.	Key No.	Kit 30735188-001 Description	Qty.
6	12	washer	1
	14	screw	1
	18	extension spring	1
	21	pawl assembly	1
	21	torsion spring	1
	37	spring bracket	1
	38	coupling	1
	40	set screw	2

Figure No.	Key No.	Kit 30735473-001 Description	Qty.
6	1	bearing block	1
	3	print lever	1
	22	nut	1
	23	set screw	1

Figure No.	Key No.	Kit 30735474-001 Description	Qty.
6	4	cam adjusting arm	1
	5	lockwasher	1
	5	screw	1
	9	cam	1
	28	set screw	1
	29	nut	1

Figure No.	Key No.	Kit 30735475-001 Description	Qty.
1	25	set screw	1
	26	bracket & pin assembly	1
	27	lever	1
	31	external cotter	1
	44	bearing	1
2	6	wire link	1
	21	bearing	1

IMPORTANT:

1. An asterisked part number indicates that the described part is commercially available. For your convenience all commercially available hardware and electrical components have been put in parts kits which can be ordered by numbers 30734892-001 (hardware) and 30734897-001 (electrical components).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

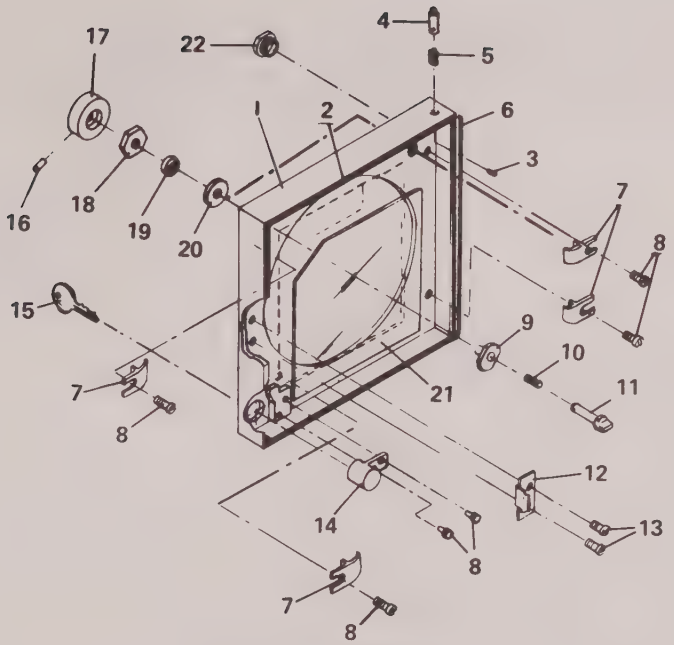

Figure 1. Door Assembly

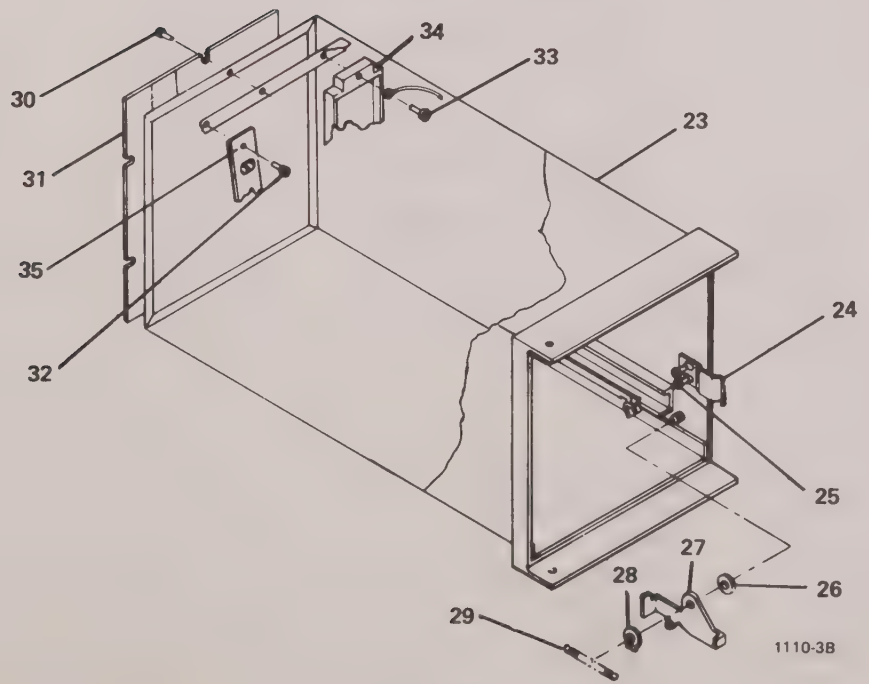

Figure 2. Case Assembly

714-0058-110

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ELECTRONIK 111
ENCLOSURE AND DOOR, SMALL
PARTS LIST

Section 714-58

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 & 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30676777-TAB	door assembly (see table 1)			1	
2	(K) 30734838-001	gasket			1	1
3	(K) 30734838-001	pin			1	1
4	(K) 30734838-001	hinge pin, top (large door)			1	1
	(K) 30734838-001	hinge pin, top (small door)			1	1
5	(K) 30734838-001	spring			1	2
6	(K) 30734838-001	gasket			1	2
7	(K) 30734838-001	clip			4	2
8	30359838-006*	screw #6 self tapping slotted hex head 3/8"			4 or 6	
9	(K) 30734838-001	bushing			1	1
	(K) 30734838-001	bushing (motor driven set point)			1	1
10	(K) 30734838-001	spring			1	1
	(K) 30734838-001	spring (motor driven set point)			1	1
11	(K) 30734838-001	shaft			1	1
	(K) 30734838-001	shaft (motor driven set point)			1	1
12	(K) 30734838-001	latch			1	1
13	30359838-001*	screw #6 self tapping slotted hex head 1/4"			2	
14	30676792-001	lock assembly with two keys (option)			1	
15	(K) 30734839-001	key			1	2
16	(K) 30734839-001	set screw			1	2
17	(K) 30734839-001	knob			1	1
	(K) 30734839-001	knob (motor driven set point)			1	1
18	(K) 30734839-001	hex nut			1	2
19	(K) 30734839-001	lockwasher			1	4
20	(K) 30734839-001	washer			1	2
	(K) 30734839-001	washer (motor driven set point)			1	4
21	30676786-001	glass (7.2" x 8.05")			1	1
22	(K) 30734839-001	lens (multipoint only)			1	1
23	30676760-001	case			1	
24	(K) 30734839-001	door catch			1	2
25	30000005-404*	screw 4-40 bdg. hd. 1/4"			2	
26	(K) 30734839-001	flat washer			2	4
27	(K) 30734839-001	chassis latch			2	2
28	(K) 30734839-001	retaining ring			2	4
29	(K) 30734839-001	spring			2	2
30	30000009-804*	screw 8-32 wsh. hd. 1/4"			6	

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Figure No. 1 & 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
31	30676766-001	rear cover			1	
32	30000005-803*	screw 8-32 bdg. hd. 3/16"			1	
33	30000005-810*	screw 8-32 bdg. hd. 5/8"			1	
34		drawbridge, chassis (refer to section 715-51 for detail parts)			1	
35		drawbridge, pneumatic (refer to section 715-51 for detail parts)			1	

TABLE 1

PART NO.	DESCRIPTION
30676777-009	door assembly-strip chart w/o lock
30676777-010	door assembly-strip chart w/set point w/o lock
30676777-011	door assembly-strip chart w/lock
30676777-012	door assembly-strip chart w/set point and lock
30676777-013	door assembly-circular chart w/o lock
30676777-014	door assembly-circular chart w/set point w/o lock
30676777-015	door assembly-circular chart w/lock
30676777-016	door assembly-circular chart w/set point and lock
30676777-021	door assembly-multipoint w/o lock
30676777-022	door assembly-multipoint w/set point w/o lock
30676777-023	door assembly-multipoint w/lock
30676777-024	door assembly-multipoint w/set point and lock

Summary of Kit Contents
Kit No. 30734838-001

Figure No.	Key No.	Desctiption	Qty.
1	2	gasket	1
	3	pin	1
	4	hinge pin, top (large door)	1
	4	hinge pin, top (small door)	1
	5	spring	2
	6	gasket	2
	7	clip	2
	9	bushing (motor driven set point)	1
	10	spring	1
	10	spring (motor driven set point)	1
	11	shaft	1
	11	shaft (motor driven set point)	1
	12	latch	1

Kit No. 30734839-001

1	15	key	2
	16	set screw	2
	17	knob	1
	17	knob (motor driven set point)	1
	18	hex nut	2
	19	lockwasher	4
	20	washer	2
	20	washer (motor driven set point)	4
	21	glass	1
	22	lens (multipoint)	1
2	24	door catch	2
	26	flatwasher	4
	27	chassis latch	2
	28	retaining ring	4
	29	spring	2

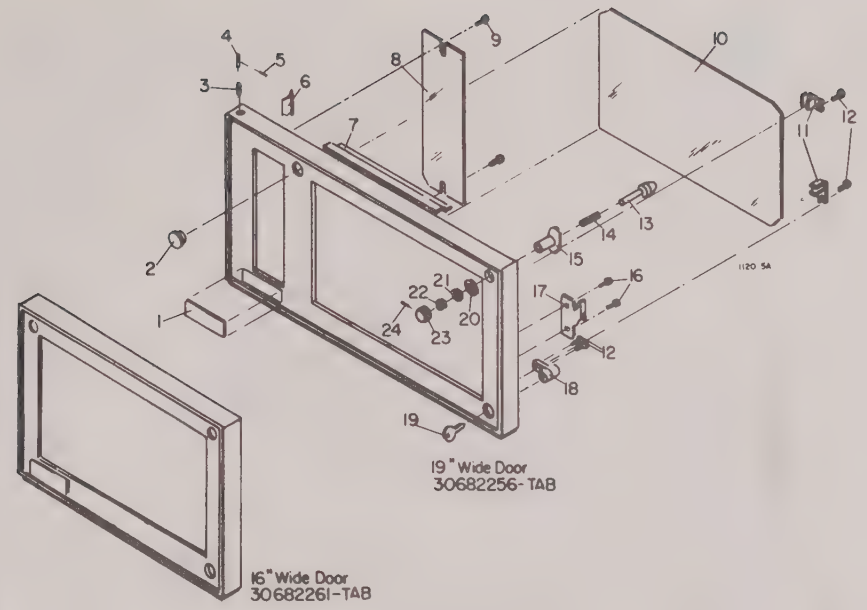

Figure 1. Door Assembly 112

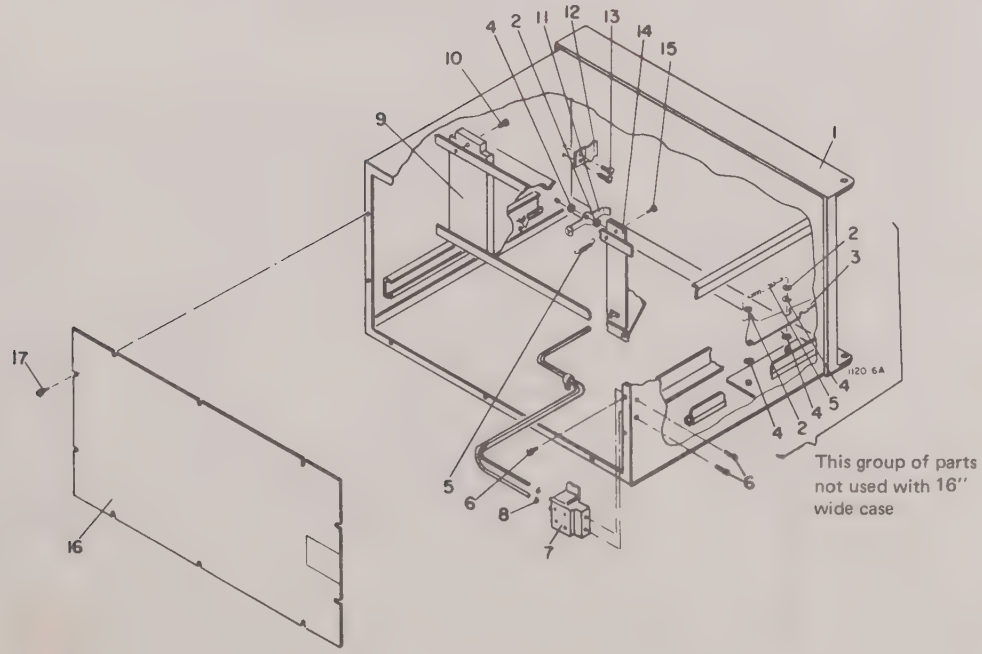

Figure 2. Case Assembly 112

714-0069-110

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ELECTRONIK 112
16" AND 19" WIDE CASE AND DOOR
PARTS LIST

Section 714-69

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30682256-TAB	19" wide door assembly (see table 1)				
	30682261-TAB	16" wide door assembly (see table 2)				
1	(K) 30734888-001	plate, identification			1	1
2	(K) 30734888-001	lens, door (see table 1 or 2)**				1
3	(K) 30734888-001	spring, compression			1	2
4	(K) 30734888-001	hinge pin			1	1
5	(K) 30734888-001	pin			1	2
6	(K) 30734888-001	gasket			1	1
7	(K) 30734888-001	gasket (16" wide door)			1	1
	(K) 30734888-001	gasket (19" wide door)			1	1
8	(K) 30734888-001	cover (when not using integrally mounted control chassis)**			1	1
9	30359838-001*	screw #6 self tapping slotted hex hd. 1/4"**			2	
10	30682288-001	glass (12.67" x 8.12")			1	1
11	(K) 30734888-001	clip			5	2
12	30359838-006*	screw (see table 1 or 2)				
13	(K) 30734888-001	shaft (see table 1 or 2)				1
14	(K) 30734888-001	spring (see table 1 or 2)				1
15	(K) 30734888-001	bushing (see table 1 or 2)				1
16	30359838-001*	screw #6 self tapping slotted hex. hd. 1/4"			2	
17	(K) 30734888-001	latch			1	1
18	30676792-001	lock assembly with two keys (see table 1 or 2) option				
19	(K) 30734888-001	key (see table 1 or 2)				2
20	30371348-001*	washer (see table 1 or 2)				
21	30352213-000*	lockwasher (see table 1 or 2)				
22	30356657-000*	hex nut (see table 1 or 2)				
23	(K) 30734888-001	knob (see table 1 or 2)				1
24	(K) 30734888-001	set screw (see table 1 or 2)				2

** not part of door assembly 30682256-TAB, 30682261-TAB.

714-0069-110

TABLE 1 (19" WIDE DOOR)

Figure and Key No.		Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit 30682256-001	002	003	004	005	006	007	008	Kit
		30682256-001	door assembly w/o set point & lock			1	–	–	–	–	–	–	–	
		30682256-002	door assembly w/set point w/o lock			–	1	–	–	–	–	–	–	
		30682256-003	door assembly w/o set point w/lock			–	–	1	–	–	–	–	–	
		30682256-004	door assembly w/set point & lock			–	–	–	1	–	–	–	–	
		30682256-005	door assembly, multipoint w/o set point & lock			–	–	–	–	1	–	–	–	
		30682256-006	door assembly, multipoint w/set point w/o lock			–	–	–	–	–	1	–	–	
		30682256-007	door assembly, multipoint w/o set point w/lock			–	–	–	–	–	–	1	–	
		30682256-008	door assembly, multipoint w/set point & lock			–	–	–	–	–	–	–	1	
2	(K)	30734888-001	lens, door			–	–	–	–	1	1	1	1	1
12		30359838-001*	screw #6 self tapping slotted hex hd. 3/8"			5	5	7	7	5	5	7	7	
13	(K)	30734888-001	shaft			–	1	–	1	–	1	–	1	1
14	(K)	30734888-001	spring			–	1	–	1	–	1	–	1	1
15	(K)	30734888-001	bushing			–	1	–	1	–	1	–	1	1
18		30676792-001	lock assembly			–	–	1	1	–	–	1	1	
19	(K)	30734888-001	key			–	–	1	1	–	–	1	1	2
20		30371348-001*	washer .3281 ID x .875 OD x .0625 thk			–	1	–	1	–	1	–	1	
21		30352213-000*	lockwasher 5/16 internal tooth shake proof			–	1	–	1	–	1	–	1	
22		30356657-000*	hex nut 5/16–24 x 3/32 thk			–	1	–	1	–	1	–	1	
23	(K)	30734888-001	knob			–	1	–	1	–	1	–	1	1
24	(K)	30734888-001	set screw			–	1	–	1	–	1	–	1	2

TABLE 2 (16" WIDE DOOR)

						30682261-001	002	003	004	005	006	007	008	
		30682261-001	door assembly w/o set point / lock			1	–	–	–	–	–	–	–	
		30682261-002	door assembly w/set point w/o lock			–	1	–	–	–	–	–	–	
		30682261-003	door assembly w/o set point w/lock			–	–	1	–	–	–	–	–	
		30682261-004	door assembly w/set point & lock			–	–	–	1	–	–	–	–	
		30682261-005	door assembly, multipoint w/o set point & lock			–	–	–	–	1	–	–	–	
		30682261-006	door assembly, multipoint w/set point w/o lock			–	–	–	–	–	1	–	–	
		30682261-007	door assembly, multipoint w/o set point w/lock			–	–	–	–	–	–	1	–	
		30682261-008	door assembly, multipoint w/set point & lock			–	–	–	–	–	–	–	1	
2	(K)	30734888-001	lens, door			–	–	–	–	1	1	1	1	1
12		30359838-001*	screw #6 self tapping slotted hex hd. 3/8"			5	5	7	7	5	5	7	7	
13	(K)	30734888-001	shaft			–	1	–	1	–	1	–	1	1
14	(K)	30734888-001	spring			–	1	–	1	–	1	–	1	1
15	(K)	30734888-001	bushing			–	1	–	1	–	1	–	1	1
18		30676792-001	lock assembly			–	–	1	1	–	–	1	1	
19	(K)	30734888-001	key			–	–	1	1	–	–	1	1	2
20		30371348-001*	washer .3281 ID x .875 OD x .0625 thk			–	1	–	1	–	1	–	1	
21		30352213-000*	lockwasher 5/16 internal tooth shake proof			–	1	–	1	–	1	–	1	
22		30356657-000*	hex nut 5/16–24 x 3/32 thk			–	1	–	1	–	1	–	1	
23	(K)	30734888-001	knob			–	1	–	1	–	1	–	1	1
24	(K)	30734888-001	set screw			–	1	–	1	–	1	–	1	2

ELECTRONIK 112
16" AND 19" WIDE CASE AND DOOR
PARTS LIST

Section 714-69

Figure No. 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
1	30682284-001	19" wide case			1	
	30682285-001	16" wide case			1	
2	(K) 30734888-001	retaining ring			as req'd	4
3	(K) 30734888-001	latch			1	1
4	30368014-002	washer .2570 ID x .500 OD x .0156 thk			1	
5	(K) 30734888-001	spring			as req'd	2
6	30000005-004	screw 10-32 bdg. hd. 1/4"				
7	30677303-001	pneumatic drawbridge (see figure 3)			1	
8	(K) 30734888-001	retaining ring			as req'd	4
9	See Section 716-	drawbridge assembly (chassis)			1	
10	30000005-812	screw 8-32 bdg. hd. 3/4"			as req'd	
11	(K) 30734888-001	latch			1	1
12	(K) 30734888-001	catch			1	2
13	30000005-404	screw 4-40 bdg. hd. 1/4"			2	
14	30689980-002	pneumatic drawbridge (see figure 4)			1	
15	30000005-804	screw 8-32 bdg. hd. 1/4"			as req'd	
16	30682254-001	rear cover 16" wide case			1	
	30682255-001	rear cover 19" wide case			1	

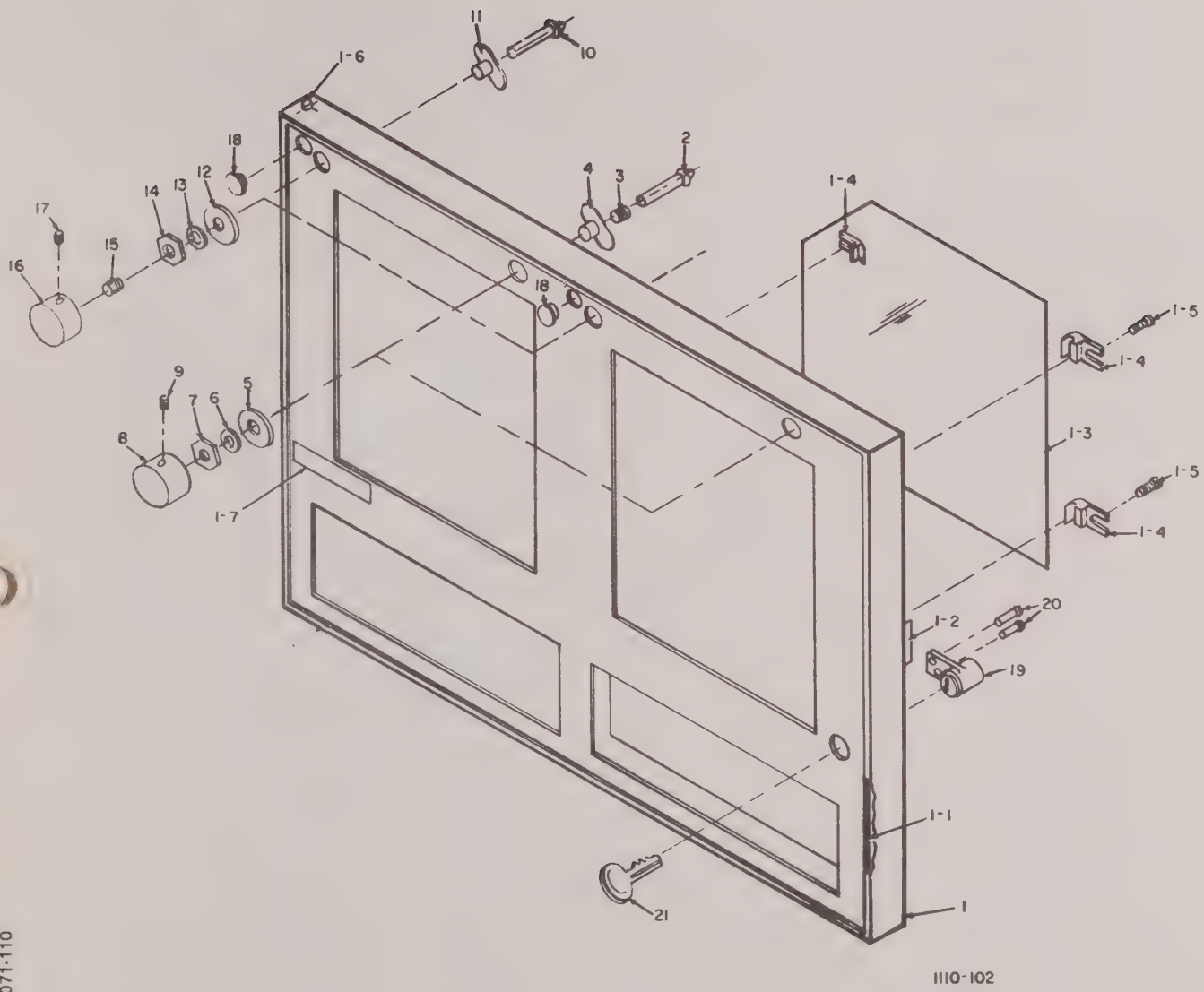

Figure 1. Door Assembly

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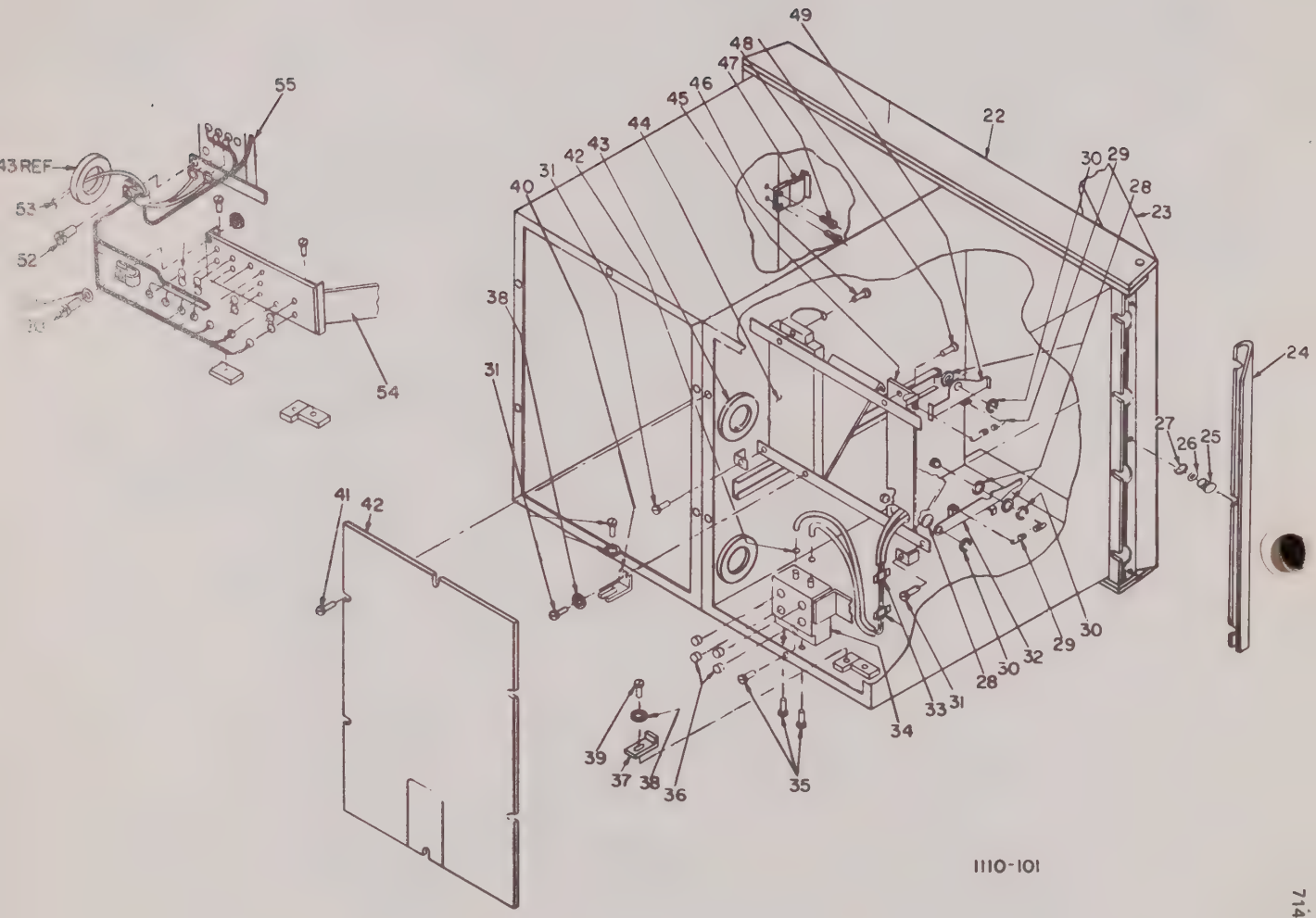

Figure 2. Case Assembly

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 & 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
1	30677473-item	door assembly (see Table 1)			1	
1-1	(K) 30734835-001	gasket			1	1
1-2	(K) 30734835-001	latch			1	1
	(K) 30734835-001	screw for mtg. latch			2	2
1-3	30676786-001	glass (7.2" x 8.05")			as req'd	1
	(K) 30734835-001	blank panel			as req'd	1
1-4	(K) 30734835-001	clip			8	4
1-5	(K) 30734835-001	screw			8	4
1-6	(K) 30734835-001	upper hinge pin			1	1
	(K) 30734835-001	spring			1	2
	(K) 30734835-001	pin			1	2
	(K) 30734835-001	bottom hinge pin			1	1
1-7	(K) 30734835-001	nameplate			1	1
2	(K) 30734835-001	shaft			1	1
3	(K) 30734835-001	spring			1	1
4	(K) 30734835-001	bushing			1	1
5	(K) 30734835-001	washer			1	2
7	(K) 30734835-001	nut			1	2
8	(K) 30734835-001	knob			1	1
9	(K) 30734835-001	set screw			1	2
		Parts for Motor Driven Set Point				
10	(K) 30734836-001	shaft			1	1
11	(K) 30734836-001	bushing			1	1
12	(K) 30734836-001	washer			1	4
13	(K) 30734836-001	lockwasher			1	4
14	(K) 30734836-001	nut			1	2
15	(K) 30734836-001	spring			1	2
16	(K) 30734836-001	knob			1	1
17	(K) 30734836-001	set screw			1	4
18	(K) 30734836-001	lens (multipoint only)			1	1
19	30676792-001	lock assembly			1	
20	(K) 30734836-001	screw			1	4
21	(K) 30734836-001	key			1	2
22	30677455-001	case assembly			1	
23	30677473-item	door assembly (see figure 1)			1	
24	(K) 30734837-001	flange cover			2	1
25	(K) 30734837-001	screw			6	2
26	30354697-014	"O" ring			6	
27	(K) 30734837-001	spring washer			6	4

Figure No. 1 & 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
28	(K) 30734837-001	washer			4	4
29	(K) 30734837-001	spring			2	2
30	(K) 30734837-001	retaining ring			3	4
31	30000005-804*	screw 8-32, bd. hd. 1/4"			4	
32	(K) 30734837-001	latch			1	1
33	30354697-515	"O" ring			2	
34	30677303-001	pneumatic drawbridge (see section 715-51 for detailed parts)			1	
35	30000005-004*	screw 10-32 bd. hd. 1/4"			3	
36	(K) 30734837-001	cap plugs			4	4
37	(K) 30734837-001	stop			1	2
38	30009771-000	lockwasher			3	
39	30000005-803*	screw 8-32 bd. hd. 3/16"			3	
40	(K) 30734837-001	bracket			8	2
41	30000024-804*	screw 8-32, 1/4"			1	
42	30676766-002	back plate			1	
43	(K) 30734837-001	grommet			2	4
44		chassis assembly (refer to section 716-76 for detailed parts)			1	
45		pneumatic drawbridge (see section 715-51 for detailed parts)			1	
46	30000005-812*	screw 8-32 bd. hd. 3/4"			1	
47	(K) 30734837-001	catch			1	2
48	30000005-404*	screw 4-40 bd. hd. 1/4"			2	
49	(K) 30734837-001	latch			1	1
50	30000005-408*	screw 4-40 bd. hd. 1/2"			1	
51	30004972-000	washer			1	
52	30000005-806*	screw 8-32 bd. hd. 3/8"			1	
53	(K) 30734837-001	cable			1	1
54	30677252-001	drawbridge electric (see section 715-51 for detailed parts)			1	
55	30677197-001	wire harness			1	

TABLE 1 – DOOR ASSEMBLY

Part No.	Configuration		Basic Door
30677473-001	Circular Left	Circular Right	30677471-001
30677473-002	Circular Left	Strip Right	30677471-002
30677473-003	Circular Left	Blank Right	30677471-002
30677473-004	Strip Left	Strip Right	30677471-003
30677473-005	Strip Left	Blank Right	30677471-003

Summary of Kit Contents
Kit No. 30734835-001

Figure No.	Key No.	Description	Qty.
1 & 2	1-1	gasket	1
	1-2	latch	1
	1-2	screw for mtg. latch	2
	1-3	blank panel	1
	1-4	clip	4
	1-5	screw	4
	1-6	upper hinge pin	1
	1-6	spring	2
	1-6	pin	2
	1-6	bottom hinge pin	1
	1-7	nameplate	1
	2	shaft	1
	3	spring	1
	4	bushing	1
	5	washer	2
	7	nut	2
	8	knob	1
	9	set screw	2
		Kit No. 30734835-001	
1 & 2	10	shaft	1
	11	bushing	1
	12	washer	4
	13	lockwasher	4
	14	nut	2
	15	spring	2
	16	knob	1
	17	set screw	4
	18	lens	1
	20	screw	4
	21	key	2
		Kit No. 30734837-001	
	24	flange cover	1
	25	screw	2
	27	spring washer	4
	28	washer	4
	29	spring	2
	30	retaining ring	4
	32	latch	1
	36	cap plug	4
	37	stop	2
	40	bracket	2
	43	grommet	4
	47	catch	2
	49	latch	1
	53	cable	1

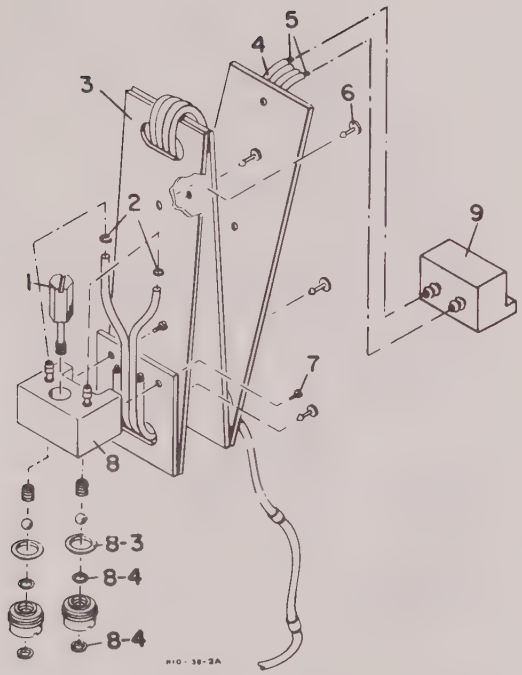

Figure 1. Drawbridge, Pneumatic Transmitter

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30689980-001	drawbridge, pneumatic transmitter			1	
1	(K) 30735146-001	screw			1	1
2	(K) 30735146-001	retaining ring			4	4
3	(K) 30735146-001	drawbridge			1	1
4	(K) 30735146-001	tubing, ribbon			1	1
5	(K) 30735146-001	spring			2	1
6	(K) 30735146-001	clip button			5	2
7	30000006-505*	screw 6-32 bdg. hd. 5/16			2	
8	30689976-001	quick disconnect			1	
8-3	30354697-512	"O" ring	1	2	2	
8-4	30354697-514	"O" ring	1	2	4	
9	30677335-001	block, customer connection			1	

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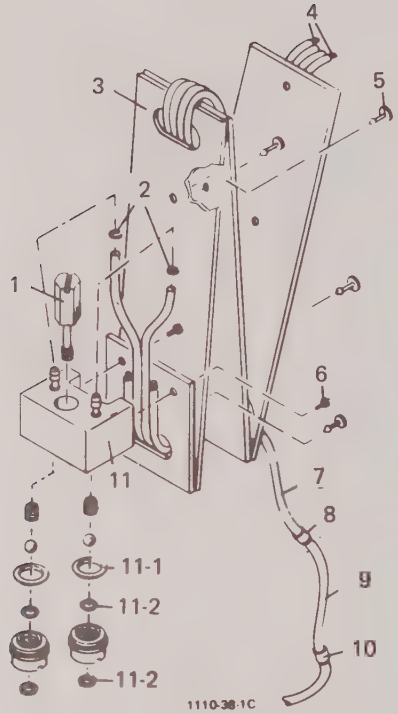

Figure 2. Drawbridge, Pneumatic Controller

Figure No. 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30689980-002	drawbridge, pneumatic controller			1	
1	(K) 30735146-002	screw			1	1
2	(K) 30735146-002	retaining ring			2	4
3	(K) 30735146-002	drawbridge			1	1
4	(K) 30735146-002	spring			2	1
5	(K) 30735146-002	clip button			4	2
6	30000005-605*	screw 6-32 bdg. hd. 5/16"			2	
7	(K) 30735146-002	tubing ribbon			1	1
8	(K) 30735146-002	connector			4	2
9	(K) 30735146-002	tubing			2	1
10	(K) 30735146-002	tubing			2	2
11	30689976-001	quick disconnect			1	
11-1	30354697-512	"O" ring	1	2	2	
11-2	30354697-514	"O" ring	1	2	4	

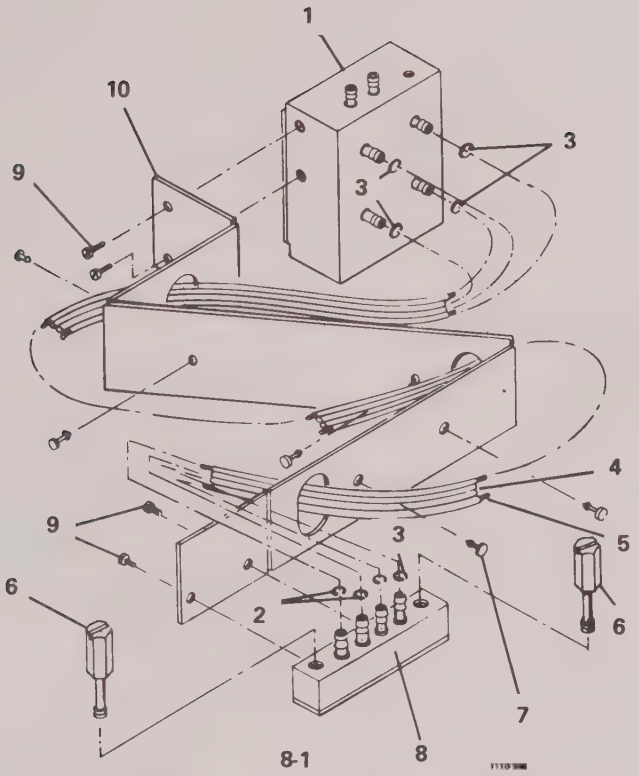

Figure 3. Drawbridge, Pneumatic Controller, Internally Mounted

Figure No. 3

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30677303-001	drawbridge, pneumatic controller internally mounted			1	
1	30677285-001	block assembly, cust. conn.			1	
2	(K) 30735146-003	retaining ring			4	4
3	(K) 30735146-003	retaining ring			4	4
4	(K) 30735146-003	tubing ribbon			1	1
5	(K) 30735146-003	spring			2	1
6	(K) 30735146-003	screw 8-32, connecting block			2	1
7	(K) 30735146-003	clip retaining			5	2
8	30677299-001	block connection assembly			1	
8-1	(K) 30735146-003	gasket			1	2
9	30000005-604*	screw 6-32 bdg. hd. 1/4"			4	
10	(K) 30735146-003	drawbridge			1	1

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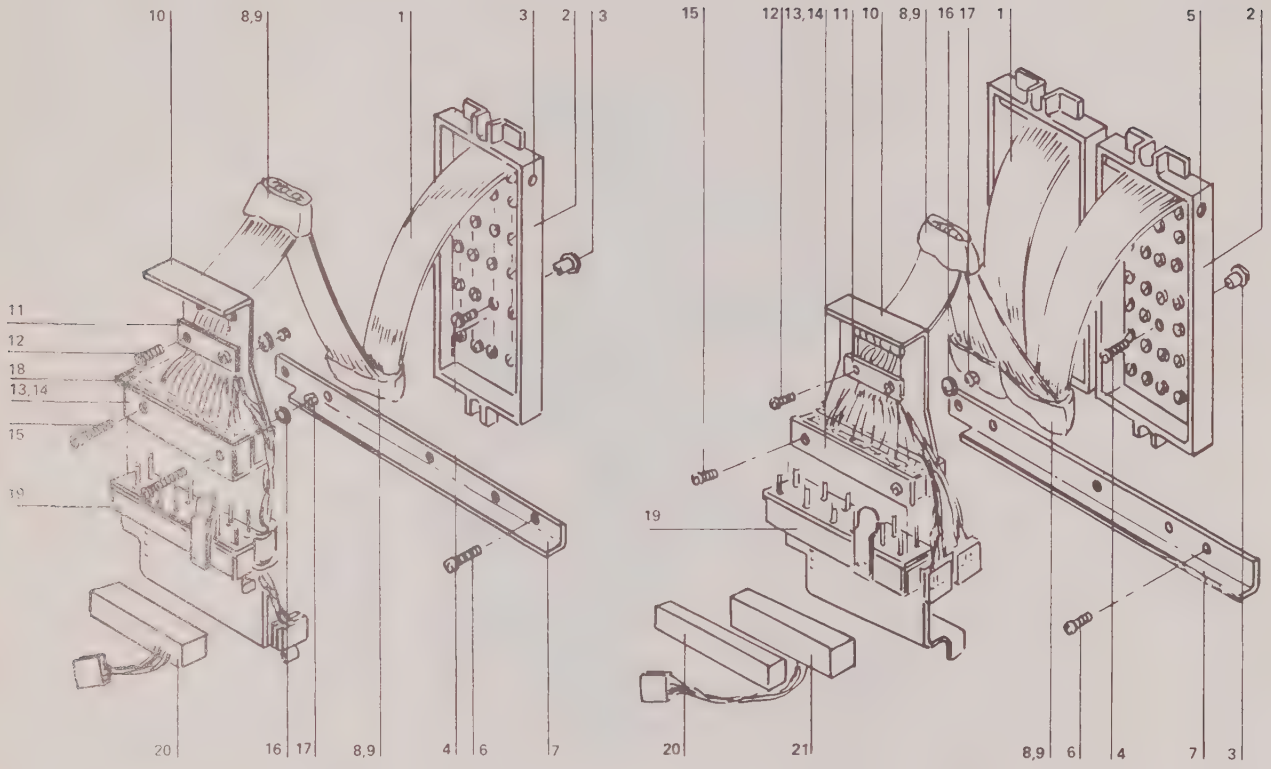

Figure 4. Instrument Drawbridge and Terminal Panel Assembly

Figure No. 4 and Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity 1 Servo	Quantity 2 Servo
	30736000-001	drawbridge & terminal panel assembly, one servo model 111/112 Dual Range or Select-O-Range multipoint			1	
	30736000-002	drawbridge & terminal panel assembly, two servo or dual range — one pen model 111/112				1
1	30735983-001	ribbon cable ass'y			1	2
2	30676838-001	terminal panel			1	2
3	30676835-001	connector			9	14
4	30000005-803*	screws 8-32 bd. hd. 3/16" long			9	14
5	30735984-001	stress rod			1	2
6	30000005-810*	screw 8-32 bd. hd. 5/8" long			1	2
7	30676769-001	111 mtg. bracket			1	2
	30682265-001	112 mtg. bracket			1	2
8	30735985-001	stress tube			2	1
	30735985-002	stress tube			—	1
9		heat shrink tubing or tape				
10	30735987-001	bracket			1	1
11	30735986-001	cable clamp			1	1

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Figure No. 4 and Key No.	Part No.	Description	Recom'd Sapre Parts Per 10	Recom'd Sapre Parts Per 100	Quantity 1 Servo	Quantity 2 Servo
12	30000005-406*	screw bd. hd. 4-40 3/8" long			2	4
13	30735990-001	mounting adapter			2	2
14	30736214-001	label			1	1
15	30000008-418*	screw 4-40 fistr. hd. 1-1/8" long			2	2
16	30006945-000*	washer			1	2
17	30000015-440*	nut			2	2
18	30735994-120	spacer			1	—
19	30736001-001	connector ass'y — 1 servo			1	—
	30736001-002	connector ass'y — 2 servo			—	1
20	30736003-001	power cable ass'y			1	1
21	30735994-020	connector			—	1

Summary of Kit Contents

Figure No.	Key No.	Description	Qty.
		Kit No. 30735146-001	
1	1	screw	1
	2	retaining ring	4
	3	drawbridge	1
	4	ribbon tubing	1
	5	spring	1
	6	clip button	2
		Kit No. 30735146-002	
2	1	screw	1
	2	retaining ring	4
	3	drawbridge	1
	4	spring	1
	5	clip button	2
	7	tubing ribbon	1
	8	connector	2
	9	tubing	1
	10	tubing	2
		Kit No. 30735146-003	
3	2	retaining ring	4
	3	retaining ring	4
	4	tubing ribbon	1
	5	spring	1
	6	screw	2
	7	clip retaining	2
	8-1	gasket	2
	10	drawbridge	1

Model 111 & 112 Chassis Assembly

Parts List

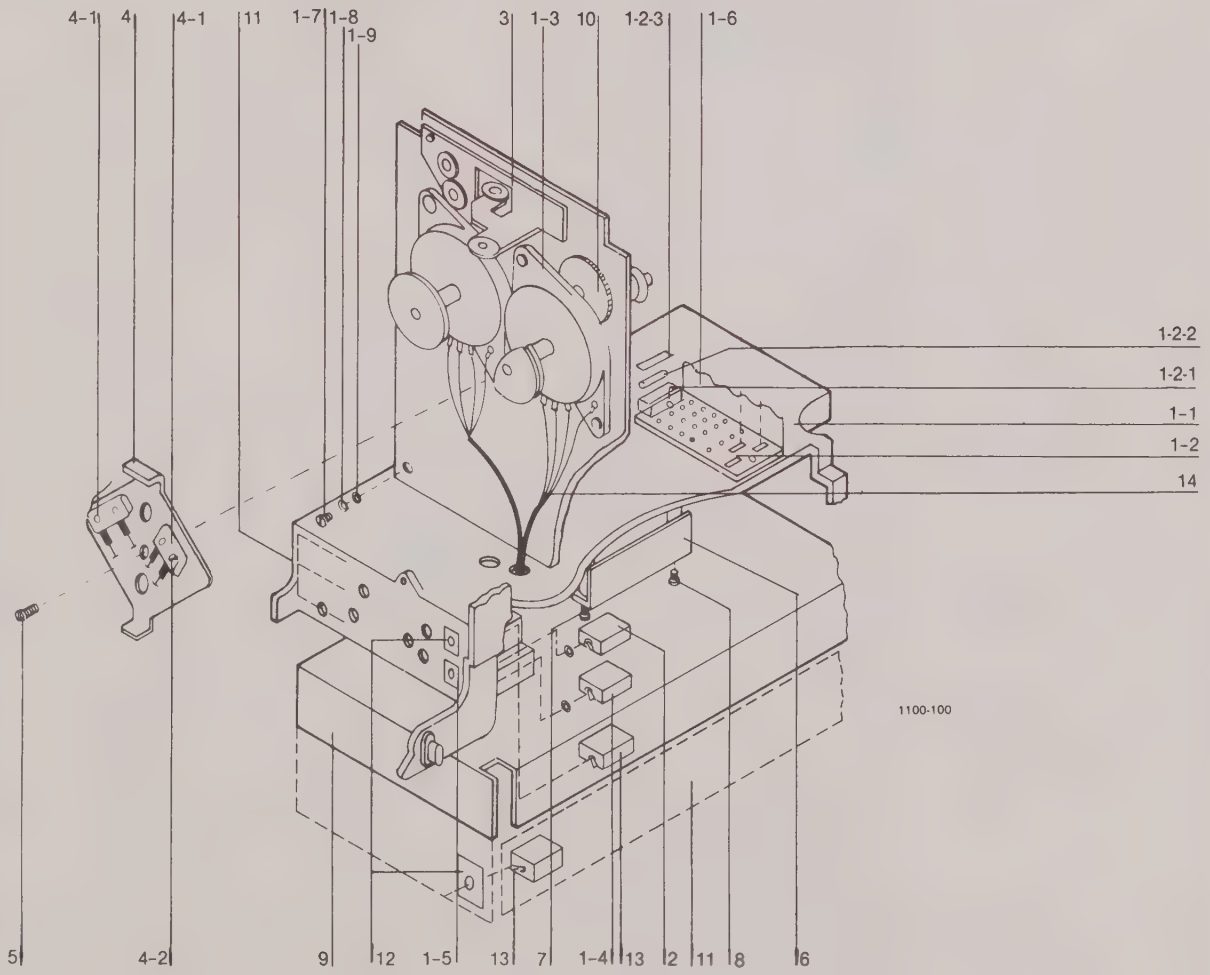

Figure 1 – Model 111/112 Chassis Assembly

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FIGURE NO. 1

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity	Kit
1	see table 1	chassis assembly			1	
1-1	30676843-001	basic chassis, class 111			1	
	30682263-001	basic chassis, class 112			1	
1-2	30735848-001	J2 terminal connector board one pen model 111 or 112. one pen with pulse or sync motor driven set point model 111 or 112			1	
	30735848-002	J2 terminal connector board two pen or one pen with servo motor driven set point model 111 or 112 multipoint model 111 or 112. one pen or multipoint Dual Range Model 111 or 112			1	
1-2-1	30731384-001	shroud				
1-2-2	30351949-003	fuse 1 amp Slo-Blo	1	2	1	
1-3-3	30735991-001	cover			1	
1-3	see Table 1	servo drive assembly (see Figure 2 for detail parts)				
1-4	30676832-004	power switch				
	(K)30734935-001	lockwasher			1	1
1-5	(K)30734935-001	nameplate (112)			1	1
1-6	30736000-item	terminal panel & drawbridge see Section 715-53			1	
1-7	30000005-810*	screw 8-32 bd. hd. 5/8''			2	
1-8	30009771-000*	lockwasher			2	
1-9	(K)30734935-001	washer			2	6
2		chart drive switches (see Section 753-XXX)			1	
3		gear mtg. plate assembly (motor drive set point) see section 763-34			1	
4	30682483-003	bracket and switch			1	
4-1	(K)30734897-001	micro switch			2	1
4-2	30000008-206	screw			4	
	(K)30734935-001	lockwasher			4	1
5	*30000012-804	screw 8-32 flat hd. 1/4''			1	
6	(K)30734935-001	cover			1	---
7	*30000005-606	screw 6-32 bd. hd. 3/8''			1	
8	*30000005-603	screw 6-32 bd. hd. 3/16''			1	
9		recorder servo assemblies (see section 731-9)			1	
10		error generator motor driven set point see section 763-34				
11		Dual Range Amplifier (See Section 733-115)			1	
12	30751590-001	nameplate – Model 112			1	
	30751590-002	nameplate – Model 111			1	
13	30751585-001	dual range switch assembly (Model 112)			1	
	30751585-002	dual range switch assembly (Model 111)			1	
	30751858-003	dual range switch assembly (multipoint)			1	
14	30751583-001	signal cable assembly (multipoint)			1	
	30751583-002	signal cable assembly (single pen)			1	

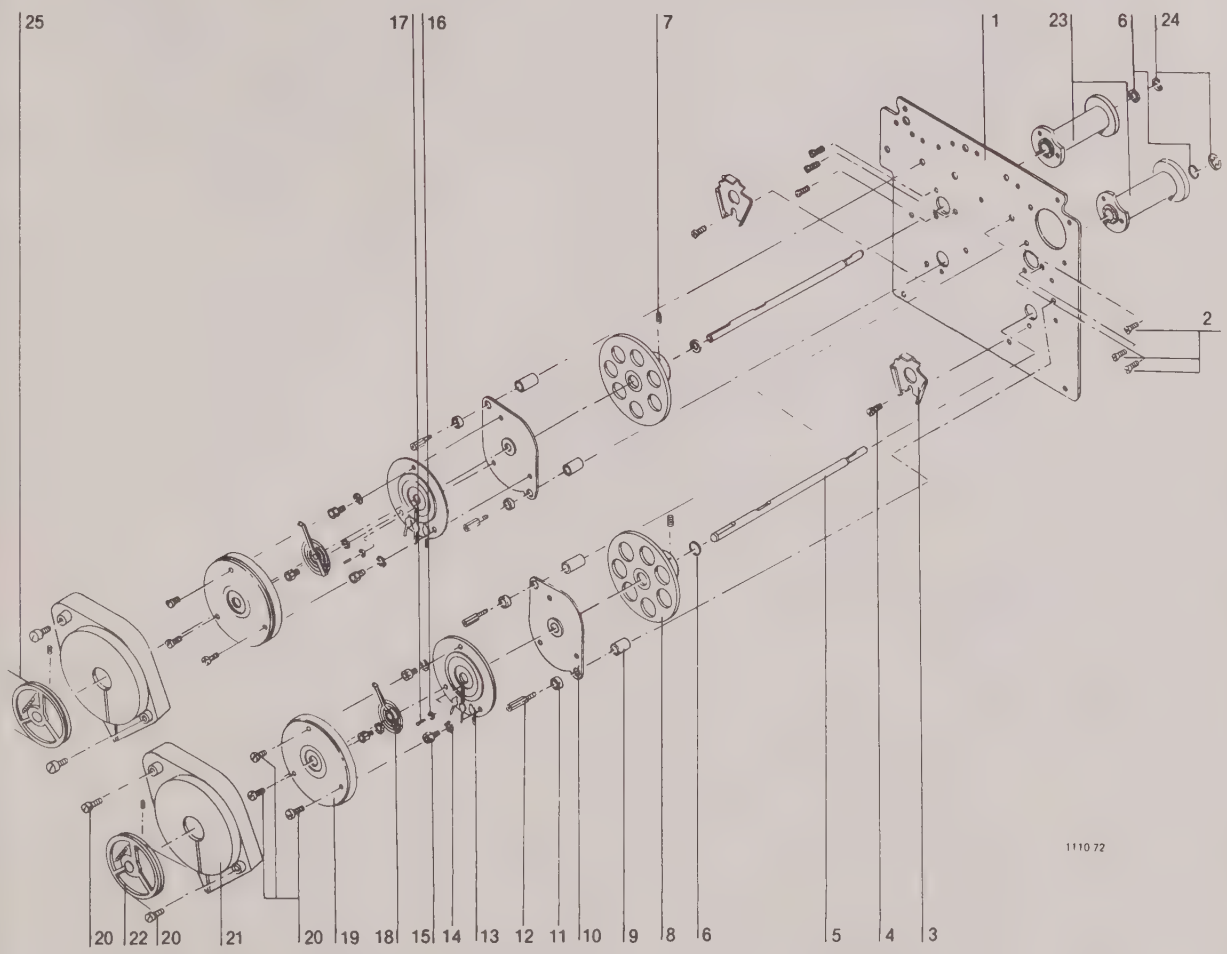


Figure 2 – Servo Drive Assembly

FIGURE NO. 2

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity		
			10	100	1st Servo	2nd Servo	Kit
1	30676858-001	servo mtg. plate, class 111			1	1	
	30682264-001	servo mtg. plate, class 112			1	1	
2	*30000007-806	screw 8-32 fil. hd. 3/8''			3	6	
3	(K)30734936-001	stop			1	2	1
	30683794-001	stop (multipoint)			1	-	
4	*30000012-804	screw 8-32 bd. hd. 1/4''			1	2	
	30000005-808	screw 8-32 bd. hd. 1/2'' (multipoint)			1	-	
	30009771-000	lockwasher (multipoint only)			1	-	
5		servo drive shaft, see Table 1			1	-	
		servo drive shaft, see Table 1			-	1	
6	(K)30734936-001	thrust washer			2	4	4
7	(K)30734936-001	set screw			2	4	4
8	30676850-001	bull gear (not used w/clutch)			1	2	
	30683788-item	bull gear (multipoint) see Figure 3			1	-	
	30732596-001	bull gear (model 112 motor driven set point only)			1	-	
9	(K)30734936-001	spacer			2	4	1
	30676828-003	spacer (multipoint)			2	-	
10	(K)30734936-001	mtg. plate			1	2	1
11	(K)30734936-001	collar			2	4	2
12	(K)30734936-001	stud			2	4	2
13	30683380-001	conductive plastic element	2	4	1	2	
14	(K)30734936-001	lockwasher			3	6	6
15	(K)30734936-001	stud			3	6	1
16	(K)30734936-001	washer			1	2	6
17	30000005-202	screw 2-56 binding head			1	2	
18	30677501-501	slidewire contact arm	2	4	1	2	
19	30676930-001	dust cover assembly			1	2	
20	30000005-403	screw 4-40 bd. hd. 3/16''			3	5	
21	30677505-001	insulating cover			1	2	
22	30676846-001	cable drum, class 111			1	1	
	30682266-001	cable drum, class 112			1	1	
23	30676855-001	bearing housing			1	2	
24	30371339-210	retaining ring			1	2	
25		Servo Drive Cable (see below)	1	4			
	30676862-001	class 111 strip chart #1 pen			1	-	
	30676862-002	class 111 strip chart #2 pen			-	1	
	30676862-001	class 111 strip chart multipoint			1	-	
	30676862-004	class 111 circular chart #1 pen			1	-	
	30676862-005	class 111 circular chart #2 pen			-	1	
	30676862-007	class 112 #1 pen			1	-	
	30676862-008	class 112 #2 pen			-	1	
	30676862-008	class 112 multipoint			1	-	

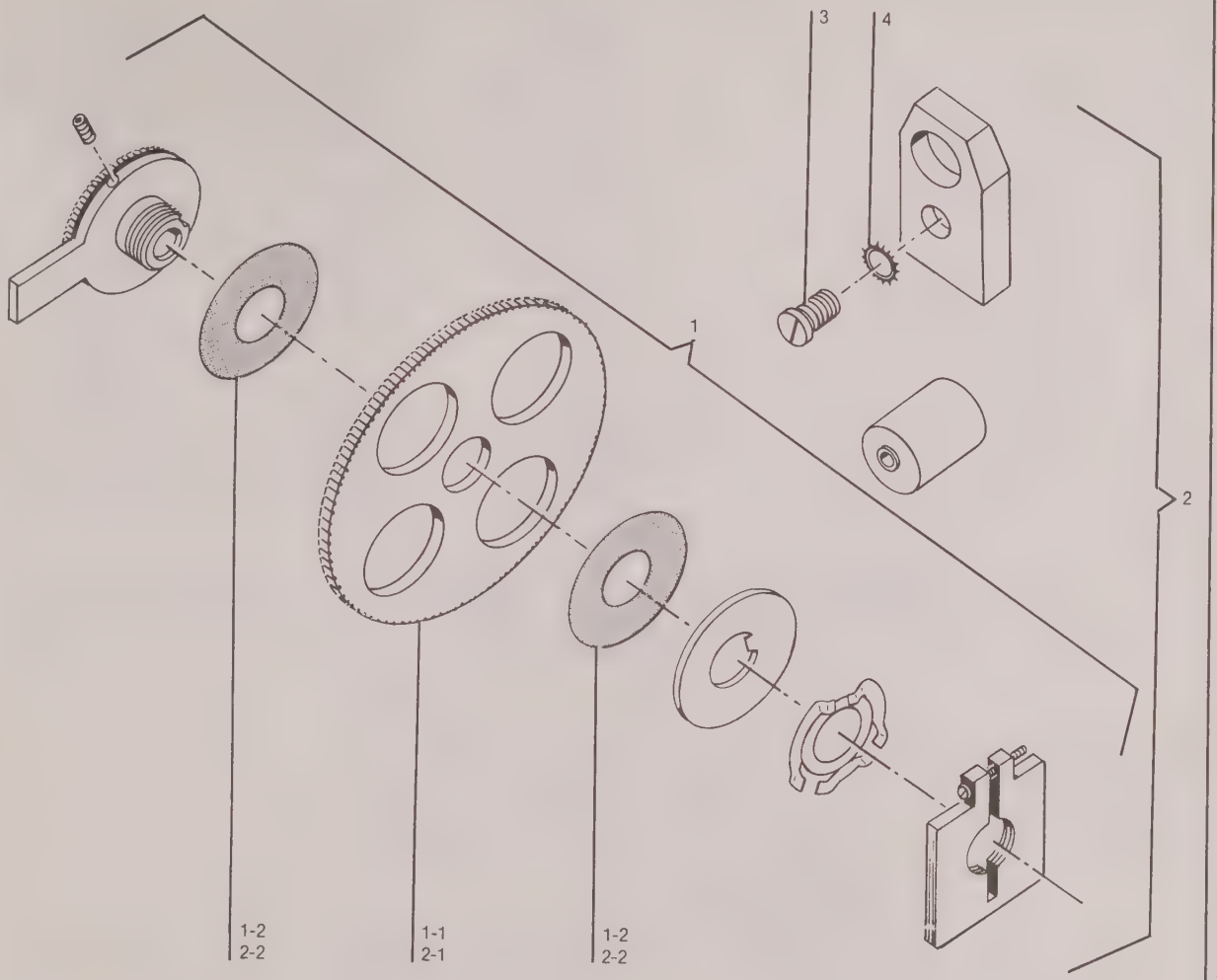


Figure 3 – Bull Gead and Clutch Assembly, used on Multipoint Recorders

FIGURE NO. 3

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity
			10	100	
1	30683788-501	replacement bull gear and clutch			1
2	30683788-502	conversion to new design bull gear and clutch assembly			1
1-1 2-1	30676848-002	bull gear			1
1-2 2-2	30683789-501	friction washer (clutch) 8-pack	1	2	1
3	30000005-808*	screw 8-32 bd. hd. 1/2''			1
4	30009771-000*	lockwasher #8 serrated			1

*commercially available parts, buy locally

TABLE 1

Description	Figure No. 1 Key No. 1 Chassis Ass'y	Figure No. 1 Key No. 1-3 Servo Drive Ass'y	Figure No. 2 Key No. 5 Servo Drive Shaft
Model 111 One Pen	30676914-005	30676844-001	30679098-001
Model 111 One Pen-Dual Range	30676914-009	30676844-001	30679098-001
Model 111 Two Pen or One Pen with Motor Driven Set Point	30676914-006	30676844-002	30679098-001 30679098-001
Model 111 One Pen with Pulse or Syncr. Motor Driven Set Point	30676914-007	30676844-006	30679098-001 30679098-001
Model 112 One Pen	30682431-005	30676844-003	30679098-002
Model 112 One Pen-Dual Range	30682431-009	30676844-003	30679098-002
Model 112 Two Pen or One Pen with Motor Driven Set Point	30682431-006	30676844-005	30679098-001 30679098-002
Model 112 One Pen with Pulse Syncr. Motor Drive Set Point	30682431-008	30676844-008	30679098-001 30679098-002
Model 111 Multipoint	30676914-008	30676844-007	30679098-001
Model 111 Multipoint-Dual Range/Select-O-Range	30676914-010	30676844-007	30679098-001
Model 112 Multipoint	30682431-007	30676844-009	30679098-002
Model 112 Multipoint-Dual Range/Select-O-Range	30682431-010	30676844-009	30679098-002

IMPORTANT:

1. An asterisked part number indicates that the described part is commercially available. For your convenience all commercially available hardware and electrical components have been put in parts kits which can be ordered by numbers 30734892-001 (hardware) and 30734897-001 (electrical components).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

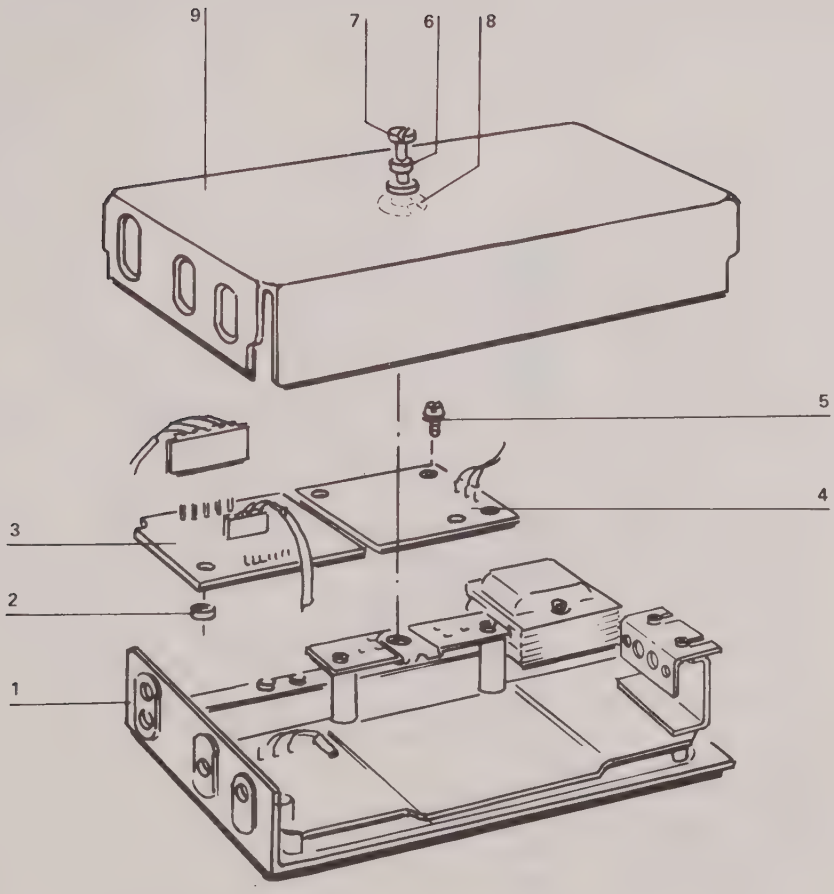
SUMMARY OF KIT CONTENTS

Kit No. 30734935-001

Figure No.	Key No.	Description	Qty.
1	1-4	shoulder screw	2
	1-5	plug housing	1
	1-9	lockwasher	6
	4-2	lockwasher	1
	6	cover	1

Kit No. 30734936-001

2	14	stop	1
	17	thrust washer	3
	18	set screw	4
	20	spacer	1
	21	mtg. plate	1
	22	collar	2
	23	stud	2
	25	lockwasher	6
	26	stud	1
	27	washer	6



Servo Package

731-0009-110

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IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
1	30679257-502	amplifier assembly, single end (see Section 742-40)			1	
	30679256-503	amplifier assembly, push-pull (see Section 742-41)			1	
2	(K) 30734891-001	spacer			1	4
3	30370790-999	measuring circuit unit for T.C. M.V., D.C., Volt tachometer, D.C. current & radiamatic actuations			1	
	30370791-999	measuring circuit unit for resistance thermometer			1	
3-1	30682793-001	zero adjustment pot (not shown)			1	
3-2	30682793-002	span adjustment pot (not shown)			1	
3-3	(K) 30734891-001	pot mtg. bkt. (not shown)			1	2
3-4	(K) 30734891-001	nylon screw for mtg. bkt.			1	4
4	30372970-501	constant voltage unit, resistance thermometer actuation			1	
	30372971-501	constant voltage unit, all other actuations except conductivity			1	
5	(K) 30734891-001	screw			as req'd	6
6	(K) 30734891-001	bearing, snap in			1	4
7	(K) 30734891-001	stud, 1/4 turn fastener			1	2
8	(K) 30734891-001	retainer			1	4
9	30679183-001	cover			1	

Model 111/112
Dual Range Amplifier

Parts List

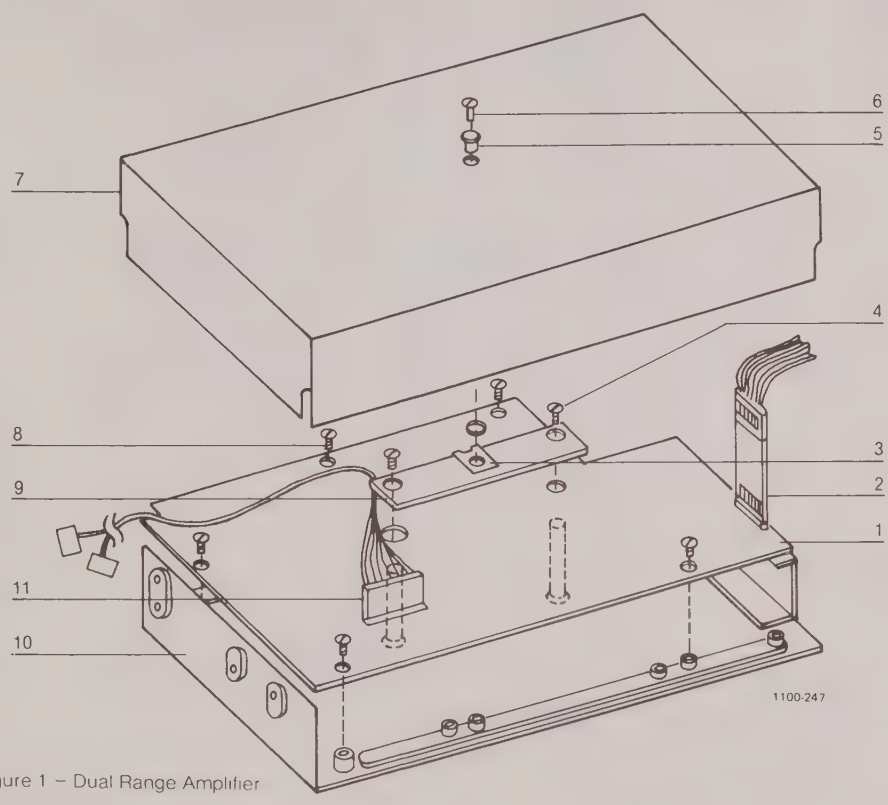

Figure 1 – Dual Range Amplifier

Key	Part	Description	Recom'd Spares per 10	Recom'd Spares per 100	Quantity Unit	Quantity Kit
1	30751418-999	Printed Wiring board (See Figure 2)			1	
2	30751582-001	Dual Range power cable			1	
3	30679206-001	Clip-on receptacle			1	
4	30679214-001*	Screw Flt.Hd. self tap 1/4''			2	
5	30679217-001	Snap-in bearing			1	
6	30679211-001	Stud			1	
7	30679183-001	Cover			1	
8	30679213-001*	Screw SLT. Hex Hd. self tap 3/8''			5	
9	30682374-001	Plate			1	
10	30679205-001	Chassis			1	
11	30751583-001 30751583-002	Signal Cable Assembly (multipoint) Signal Cable Assembly (single pen)			1 1	

*Commercially available parts

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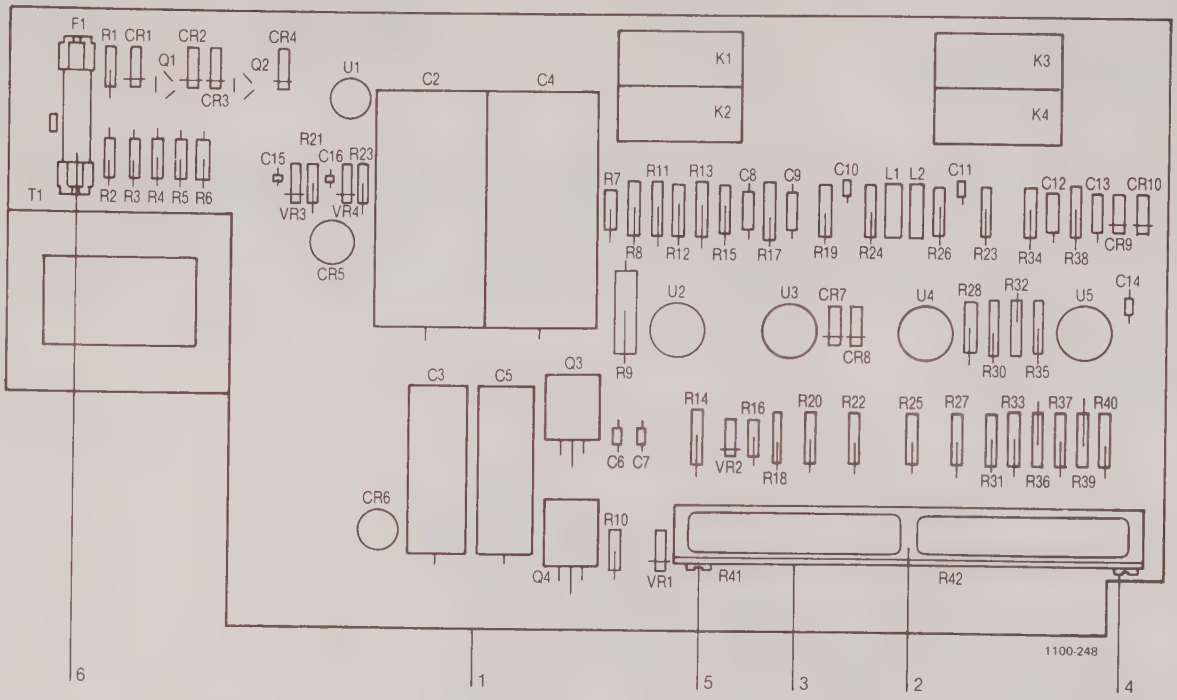

Figure 2 – Dual Range Amplifier Printed Circuit Board

Key	Part	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Per Unit
	30751418-999	Printed Wiring Board Assembly (Dual Range/Select-O-Range)			
1	30751417-001	Printed Wiring Board			1
2	30683533-002	Measuring Circuit Module			1
3	30683121-001	Cover			1
4	30681680-205	Screw			2
5	30681680-403	Screw			2
6	30076014-004 30683451-001	Fuse, 1/4A, 250V Fuse clip	1	4	1 2
K1, K2, K3, K4	30732726-001	Relay – SPST			4
U1	30679066-003	Integrated Circuit 741C			1
U2	30679066-003	Integrated Circuit 741C			1
U3, U4	30735980-002	Integrated Circuit OP-07E			2
U5	30734483-001	Integrated Circuit LM208			1
Q1	30730117-001	Transistor 2N3644			1
Q2	30723626-043	Transistor 2N3417			1
Q3	30683840-405	Voltage regulator +15V			1
Q4	99000410-605	Voltage regulator –15V			1

Key	Part	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Per Unit
CR1, CR2, CR3, CR4, CR7, CR8, CR9, CR10	30723408-010	Diode 1N459			8
CR5, CR6	30689781-001	Diode WO-2			2
VR1, VR2	30680346-001	Zener Diode 6.35V			2
VR3, VR4	30677686-022	Zener Diode 18.0V			1
T1	30751516-001	Transformer			1
R1	30732044-293*	Resistor 1.96K, 1%, 1/4W, Fixed Film			1
R2	30730713-493*	Resistor 49K, 2%, 1/4W, Fixed Film			1
R3, R4	30730713-203*	Resistor 20K, 2%, 1/4W, Fixed Film			2
R5, R6	30730713-103*	Resistor 10K, 2%, 1/4W, Fixed Film			2
R7	30730713-472*	Resistor 4.7K, 2%, 1/4W, Fixed Film			1
R8	30682641-892*	Resistor 8.25K, 1%, 1/4W, Fixed Film			1
R9	30677922-025*	Resistor 2K, 50PPM, Variable Film			1
R10, R16	30730713-821*	Resistor 820Ω, 2%, 1/4W, Fixed Film			2
R11, R30	30682641-014*	Resistor 100K, 1%, 1/4W, Fixed Film			2
R14, R35	30682641-013*	Resistor 10K, 1%, 1/4W, Fixed Film			2
R21, R23	30000010-121*	Resistor 120Ω, 10%, 1/4W			2
R37	30682641-683*	Resistor 75K, 1%, 1/4W, Fixed Film			1
R39	30682641-183*	Resistor 15K, 1%, 1/4W, Fixed Film			1
R40	30682641-433*	Resistor 27.4K, 1%, 1/4W, Fixed Film			1
R41, R42	30682793-055*	Potentiometer 10K			2
R12, R13, R15, R17, R18, R19, R20, R24, R25, R26, R27, R28, R29, R31, R32, R34, R38	—	Resistor **			
C1	30731562-451*	Capacitor 0.0047 MFd, Fixed Ceramic Dialectric			1
C2, C4	30688402-026*	Capacitor 750 MFd, Fixed electrolytic			2
C3, C5	30688402-020*	Capacitor 500 MFd, Fixed electrolytic			2
C6, C7	30731671-011	Capacitor 4.7 MFd, Fixed ceramic dialectric			2
C10, C11	30731562-611*	Capacitor 0.1 MFd, Fixed ceramic dialectric			2
C9, C13	30731563-491*	Capacitor 0.01 MFd, Fixed ceramic dialectric			2
C14	30731562-182*	Capacitor 27PF, Fixed ceramic dialectric			1
C8, C12	—	Capacitor**			2
C15, C16	30731439-501*	Capacitor 0.1 MFd			2
L1, L2	30731665-172	Inductor			2
F1	30076014-004	Fuse 1/4A, 250V			1

*Commerically available
**Value to be determined according to ranges, Specify model, serial and ranges

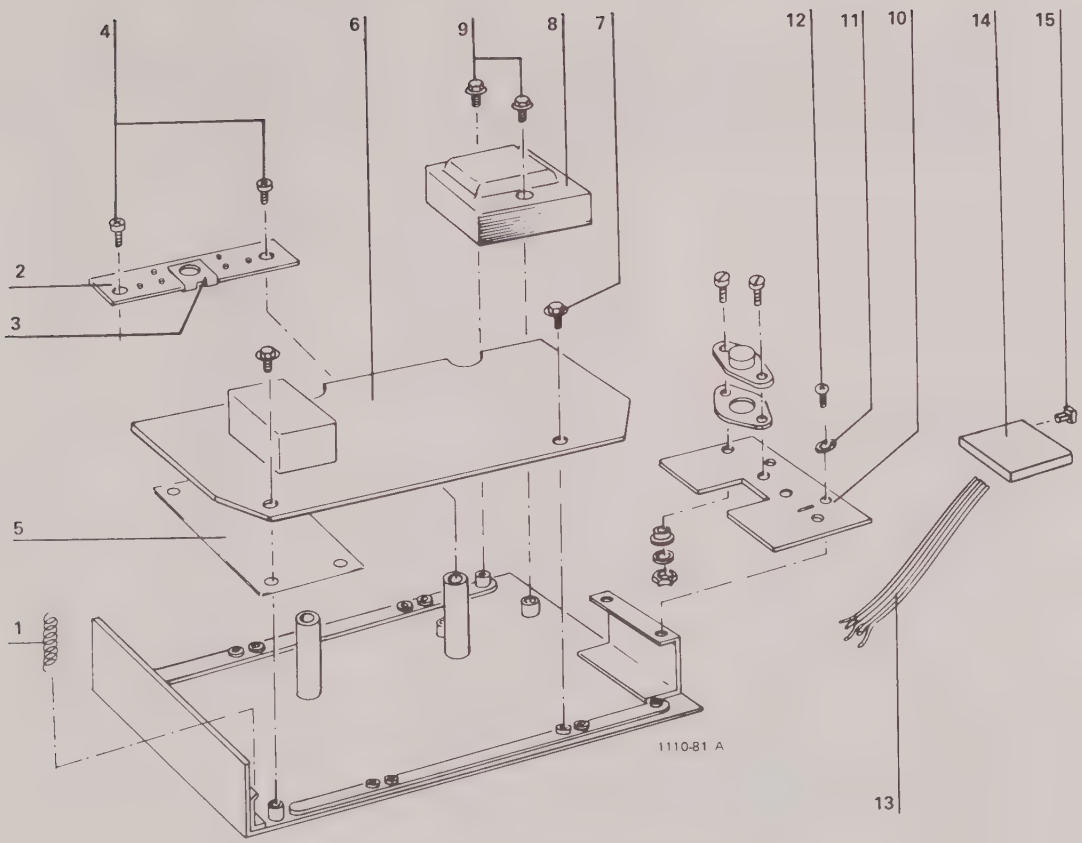

Figure 1. Amplifier Assembly (Single End)

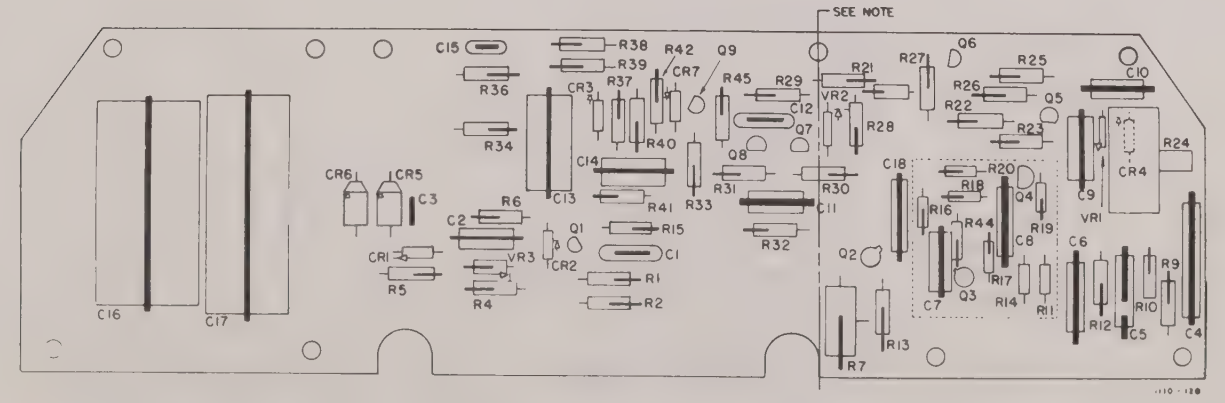

Figure 2. Amplifier Board Assembly.

NOTE: All components to the right of the dotted line not replaceable, varnished in place.

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ELECTRONIK 111 & 112
AMPLIFIER ASSEMBLY (SINGLE END)
PARTS LIST

Section 742-40

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 & 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30679257-502	amplifier assembly, single end	1	2	1	
1	(K) 30734979-001	spring			1	5
2	(K) 30734979-001	plate			1	3
3	(K) 30734979-001	receptacle, clip on			1	3
4	(K) 30734979-001	screw			2	10
5	(K) 30734979-001	insulator			1	3
6	30676602-501	amplifier board assembly (see figure 2)			1	
7	(K) 30734979-001	screw			4	8
8	30676607-001	power transformer assembly			1	
9	(K) 30734979-001	screw			2	4
10	30679203-001	heat sink assembly			1	
11	(K) 30734979-001	screw			2	4
12	30006583-000*	lockwasher .141 ID x .188 OD x .031 wall			2	
13	30676610-002	cable assembly			1	
	30676602-501	board assembly, amplifier	1	2	1	
14	30683190-020	connector			1	
15	30683183-001	dummy plug			1	
C1,C3	30723425-001*	capacitor, .1 μf, ± 20%, 200V metalized plastic			2	
C2	30687003-008*	capacitor 68 μf, ± 10%, 35V electrolytic tantalum			1	
C14	30374391-294*	capacitor 1 μf, ± 20%, 20V electrolytic tantalum			1	
C11	30687003-006*	capacitor 10 μf, ± 20%, 10V electrolytic tantalum			1	
C12	30366457-002*	capacitor .01 μf, ± 20%, 500V ceramic dielectric			1	
C13	30658402-006*	capacitor 100 μf, ± 100 - 10%, 25V electrolytic, alum oxide			1	
C15	30374136-001*	capacitor .001 μf, 25V ceramic dielectric			1	
C16	30723345-001*	capacitor 1 μf, ± 20%, 330V metalized paper			1	
C17	30723410-001*	capacitor 130 μf, ± 50-10%, 15V electrolytic, alum oxide NP			1	
CR1,CR2, CR3,CR7	30723408-010*	diode 1N459			4	
CR5, CR6	30723408-002*	diode 1N2069			2	

NOTE: All components to the right of the dotted line in Figure 1 are not replaceable, varnished in place.

742-0040-110

Figure No. 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit
Q1,Q9	30723626-036*	transistor 2N3702			2
Q7,Q8	30723626-025*	transistor 2N3391			2
R1	30000210-273*	resistor 27K +10%, 1/2w			1
R2	30000210-562*	resistor 5.6K, +10%, 1/2w			1
R4	30000205-223*	resistor 22K, +5%, 1/2w			1
R5	30000210-222*	resistor 2.2K, +10%, 1/2w			1
R6,R41	30000210-560*	resistor 56 Ω, +10%, 1/2w			2
R37,R45	30000210-103*	resistor 10K, +10%, 1/2w			2
R15	30000210-105*	resistor 1 MEG, +10%, 1/2w			1
R42	30000210-821*	resistor 820K, +10%, 1/2w			1
R31	30000210-224*	resistor 220K, +10%, 1/2w			1
R29,R36	30000210-104*	resistor 100K, +10%, 1/2w			2
R32	30000210-102*	resistor 1K, +10%, 1/2w			1
R33	30000210-683*	resistor 68K, +10%, 1/2w			1
R34	30000210-564*	resistor 560K, +10%, 1/2w			1
R38	30000210-561*	resistor 560 Ω, +10%, 1/2w			1
R39	30000210-152*	resistor 1.5K, +10%, 1/2w			1
R40	30000210-183*	resistor 18K, +10%, 1/2w			1
VR3	30369764-021*	diode 1N963B			1

NOTE: All components to the right of the dotted line not replaceable, varnished in place.

742-0040-110

(K) deontes a kit of parts. The described part is supplied in this kit and cannot be ordered separately.

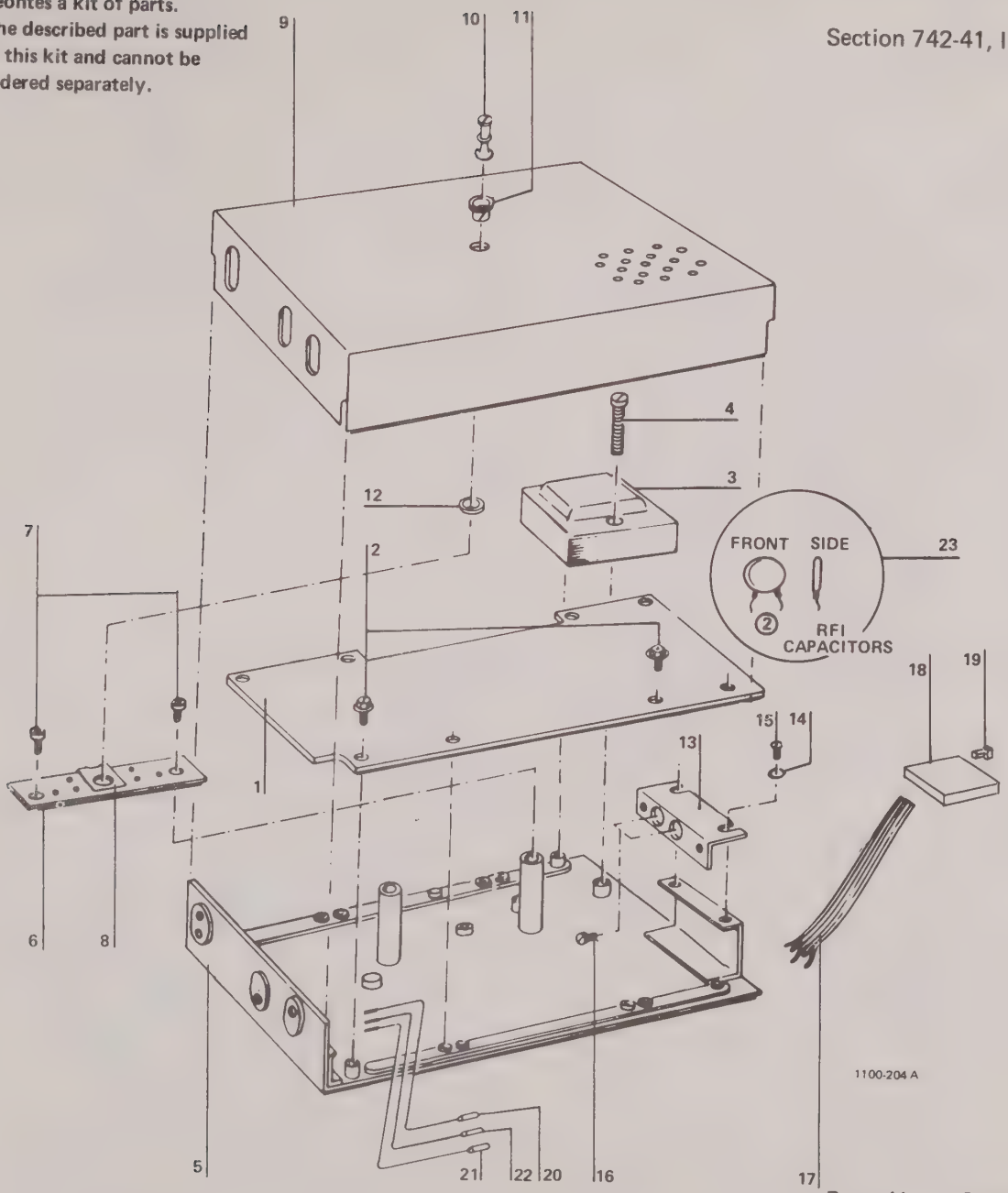

Figure 1. Amplifier Assembly

Figure 1 and Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Kit	Quantity Unit
	30679256-503	push-pull amplifier assembly				1
1	30733920-501	amplifier printed circuit board (used after Sept. 1976) See Figure 2 & 3	1	2		1
2	30679213-001*	screw slotted hex hd, self-tap 3/8"				4
3	30373322-003	power transformer				1
4	30351941-002	screw 6-20 rd. hd. ph. 1"				2
5	30679205-001	chassis assembly				1

* commercially available parts

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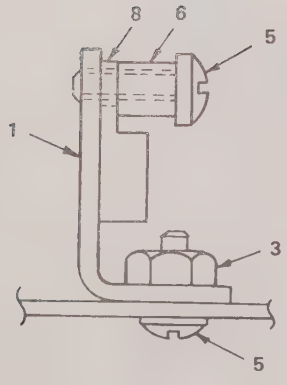
ELECTRONIK 111, 112
PUSH-PULL AMPLIFIER ASSEMBLY
PARTS LIST

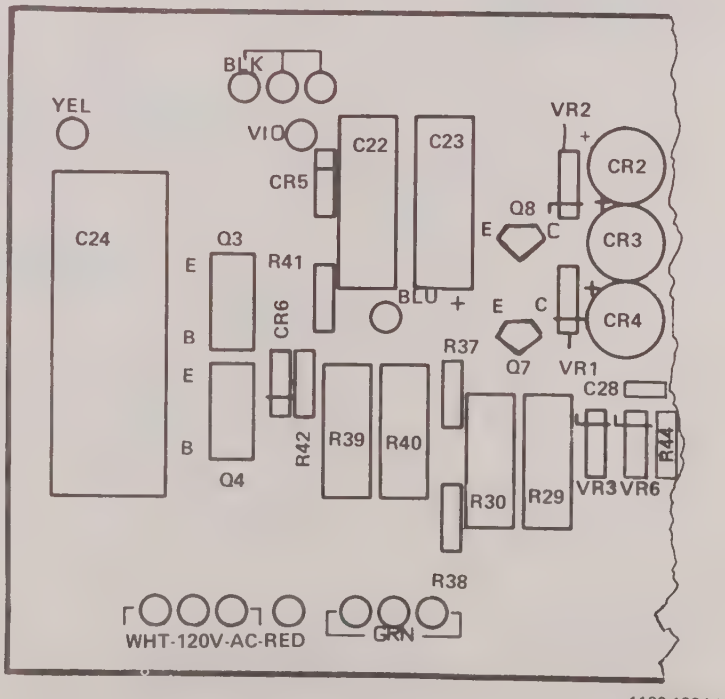
Section 742-41

(K) denotes a kit of parts. The described part is supplied in this kit and cannot be ordered separately.

Figure 1 and Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Kit	Quantity Unit
6	(K) 30735148-001	plate			1	1
7	30679214-001	screw flat hd. self-tap 1/4"				2
8	(K) 30735148-001	clip on receptacle			1	1
9	30679183-001	cover				1
10	(K) 30735148-001	stud			1	1
11	(K) 30735148-001	snap-in bearing			1	1
12	(K) 30735148-001	retainer			1	1
13	(K) 30735148-001	mounting bracket			1	1
14	30078196-000*	lockwasher #6				2
15	30000005-602*	screw 6-32 binding head 1/8"				2
16	30000005-402*	screw 4-40 binding head 1/8"				2
17	30373326-006	cable assembly				1
18	30683190-020	connector				1
19	30683183-001	dummy plug				1
20	(K) 30735148-001	jumper, black			1	1
21	(K) 30735148-001	jumper, white			1	1
22	(K) 30735148-001	jumper, green			1	1
23	(K) 30735148-001	RFI capacitor (mounted on rear of case terminal block)			2	2

* commercially available part





1100-192A1

Figure 2. Rear Half of Amplifier

742-0041-110

(K) denotes a kit of parts. The described part is supplied in this kit and connot be ordered separately.

Figure 2 & 3 and Key No.	Part No.	Description	Quantity Kit	Quantity Unit
1	(K) 30735149-001	bracket, heat sink	1	1
2	(K) 30735149-001	connectors	16	16
3	30000015-440*	hex nut #4		2
4	(K) 30735149-001	lead, black	1	1
5	30000005-406*	screw 4-40 binding hd. 3/8"		4
6	(K) 30735149-001	spacer	2	2
7	30679124-001	harness assembly		1
8	(K) 30735149-001	insulator	2	2

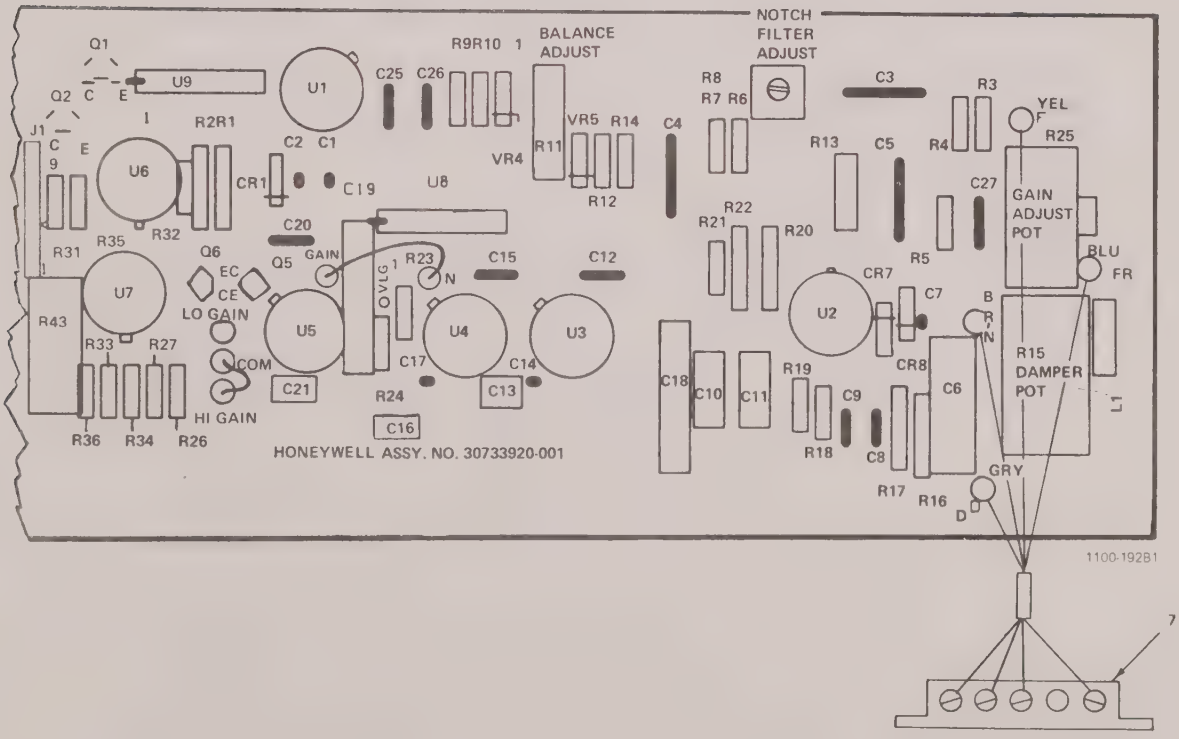


Figure 3. Front Half of Amplifier

ELECTRONIK 111, 112
PUSH-PULL AMPLIFIER ASSEMBLY
PARTS LIST

Section 742-41

(K) denotes a kit of parts. The described part is supplied in this kit and cannot be ordered separately.

Figure 2 & 3 and Key No.		Part No.	Description	Quantity Kit	Quantity Unit
C1, C2		30731441-571*	capacitor 500V dc ± 5% 220Pf		2
C3, C4, C5		30683157-001*	plastic cap. 1.5 μf ± 5% 100V dc		3
C6		30723146-012*	metalized mylar 0.56 μf ± 20% 100V dc		1
C7		30730219-001*	metalized mylar 0.047 μf ± 20% 100V dc		1
C8, C9		30723425-001*	metalized mylar 0.1 μf ± 20% 200V dc		2
C10, C11		30723146-016*	metalized mylar 0.01 μf ± 20% 100V dc		2
C12, C13, C15, C16, C20, C21					
C25, C26		30687700-005*	ceramic cap. 0.1 μf +80 −20% 50V dc		8
C14, C17		30731439-131*	ceramic cap. 100pf ± 10% 200V dc		2
C18, C19		30374412-482*	tantalum non ± 19 μf ± 20% 10V dc		2
C22, C23		30374391-436*	tantalum non ± 15 μf ± 20% 50V dc		2
C24		30723545-001*	metalized 1.0 μf ± 20% 600V dc 330V ac		1
C27		30731443-491*	metalized plastic 1.0 μf ± 10% 100V dc		1
C28		30731439-501*	ceramic cap. .1 μf ± 10% 50 Vdc		1
CR1		30681949-001*	diode IN4148		1
CR2, CR3					
CR4		30689781-001*	rectifier W02		3
CR5, CR6		30723408-002*	diode IN4003		2
CR7, CR8		30723408-010*	diode IN459		2
J1	(K)	30735149-001	pin connector	1	1
L1		30731665-120*	choke coil 2.2 μH ± 5%		1
VR1, VR2		30677686-017*	zener diode IN4742A		2
VR3		30677686-009*	zener diode IN4733A		1
VR4, VR5	(K)	30735149-001	zener diode, 6.35V dc	2	2
VR6		30677686-001*	zener diode IN4752A		1

* commercially available parts

742-0041-110

Figure 2 & 3 and Key No.	Part No.	Description	Quantity Kit	Quantity Unit
Q1, Q2	30730117-001*	transistor 2N3644		2
Q3, Q4	30683899-001*	transistor 2N6387		2
Q5, Q6	(K) 30735149-001	transistor 2N3906	2	2
Q7	30723423-012*	transistor 2N3053		1
Q8	30681165-001*	transistor 2N4037		1
R1, R2	30681310-014*	resistor metal film 100K ± 1% 1/4W		2
R3, R4	30730713-222*	resistor fixed film 2.2K ± 2% 1/4W		2
R5	30730713-183*	comp. resistor 18K ± 2% 1/4W		1
R6, R21	30730713-202*	comp. resistor 2K ± 2% 1/4W		2
R7	30730713-100*	comp. resistor 10 Ω ± 2% 1/4W		1
R8	30683155-015*	variable res. 1K		1
R9, R10	30730713-122*	comp. resistor 1.2K ± 2% 1/4W		2
R11	30677922-027*	variable res. 10K		1
R27	30730713-473*	comp. resistor 47K ± 2% 1/4W		1
R12, R35, R36	30730713-104*	comp. resistor 100K ± 2% 1/4W		3
R13	30000205-226*	comp. resistor 22M ± 5% 1/4W		1
R14, R37, R38, R41, R42	30730713-102*	comp. resistor 1K ± 2% 1/4W		5
R15	30370786-001*	variable resistor 4K		1
R16	30682641-953*	metal film res. 95.3K ± 1% 1/4W		1
R17	30681310-013*	metal film res. 10K ± 1% 1/4W		1
R18, R19, R31	30730713-105*	comp. resistor 1M ± 2% 1/4W		3
R20, R22	30681310-015*	comp. resistor 1M ± 1% 1/4W		2
R23, R26	30730713-514*	comp. resistor 510K ± 2% 1/4W		2
R24	30730713-302*	comp. resistor 3K ± 2% 1/4W		1
R25	30370787-001*	variable resistor 50K		1
R29, R30	30000305-821*	comp. resistor 820 Ω ± 5% 1W		2
R32	30730713-512*	comp. resistor 5.1K ± 2% 1/4W		1
R33	30730713-103*	comp. resistor 10K ± 2% 1/4W		1
R34	30730713-472*	comp. resistor 4.7K ± 2% 1/4W		1
R39, R40	30000411-279*	comp. resistor 2.7 Ω ± 10% 2W		2
R43	30000405-471*	comp. resistor 470 Ω ± 5% 2W		1
R44	30000110-121*	comp. resistor 120 Ω ± 10% 1/4W		1
U1, U5, U6, U7	30679066-002*	operational amplifier 741		4
U2	30683372-001	bridge modulator, integrated circuit		1
U3, U4	30734483-001*	operational amplifier LM208H		2
U8	30731437-101	resistor network 100 Ω		1
U9	30731437-103	resistor network 10K		1

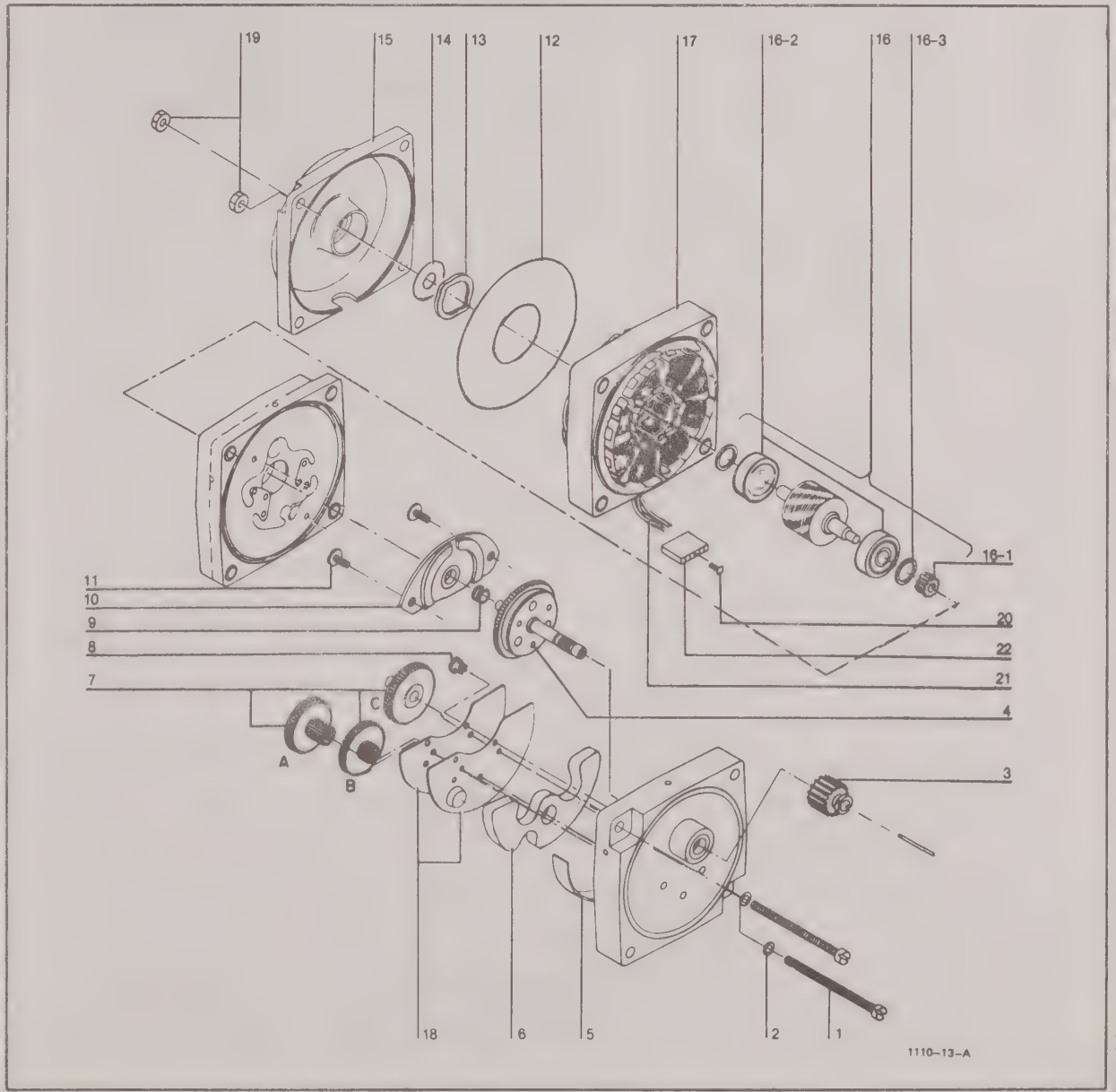
*commercially available parts

742-0041-110

Honeywell

Model 111 & 112 Servo Balancing Motor

Parts List



IMPORTANT:

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 electrical components – 1 each) and 30734892-001 (hardware – 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

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FIGURE 1

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity	
			10	100	Unit	Kit
	30676665–item	Servo balancing motor (see Table 3)	0	1	1	
	30735501–item	Servo balancing motor (accelerated Select-O-Print mechanical multipoint only (see Table 3)	0	1	1	
1	30000080–032*	screw 10–32, fil. hd. 2"		–	2	
2	30000925–000*	lockwasher #10 .249 OD X .194 ID X .040 wall			2	
3	(K) 30735143–001	output pinion			1	1
4	30362430–506	output shaft and gear			1	
	30362429–003	output shaft (used on 30676665–513 only)				
5	(K) 30735143–001	oil wick			1	2
	(K) 30735143–001	oil wick (used on 30676665–511 only)				2
6	(K) 30735143–001	oil wick			1	2
7	see Table 2	change gears A, B, C			as req'd	
8	(K) 30735143–001	fastener for wick retainer (30676665– all and 307355501–511)			1	4
9	(K) 30735143–001	spacer			1	2
10	(K) 30735143–001	bearing plate			1	1
	(K) 30735143–001	bearing plate (used on 30676665–513 only)				1
11	(K) 30735143–001	screw 6–32 bd. hd. 5/16"			2	2
12	(K) 30735143–001	insulator			1	2
13	(K) 30735143–001	spring washer			1	2
14	(K) 30735143–001	shim washer			as req'd	5
15	(K) 30735143–001	bearing housing			1	1
16	see Table 1	armature			1	
16–1	see Table 1 & 2	armature output pinion			1	
16–2	(K) 30735143–001	bearing			2	1
16–3	(K) 30735143–001	washer			2	1
17	see Table 1	stator assembly			1	
18	see Table 1	wick retainer			2	
19	30005966–000*	hex nut (10–32)			2	
20	see Table 1	cable assembly			1	
21	30683190–020	connector (used on 30676665–item only)			1	
22	30683183–001	dummy plug (used on 30676665–item only			1	

TABLE 1 - Variable Detail Parts for Servo Motor

			Motor 30676665-5XX								Motor 30735501-5XX		Kit Qty
Key	Part Number	Description	509	510	511	512	513	514	515	516	511	512	
16	30362416-501	armature	1			1		1		1	1		
	30362416-504	armature					1						
	30362416-505	armature		1					1				
	30362416-507	armature			1							1	
16-1	(K) 30735143-001	armature pinion	1			1		1		1	1		1
	(K) 30735143-001	armature pinion		1					1				1
	(K) 30735143-001	armature pinion			1							1	1
	(K) 30735143-001	armature pinion					1						1
17	30362407-005	stator assembly	1	1		1							
	30362407-008	stator assembly			1								
	30362407-013	stator assembly					1	1	1	1			
	30362407-014	stator assembly									1		
	30362407-015	stator assembly										1	
18	(K) 30735143-001	wick retainer	2	2			omit	2	2				2
	(K) 30735143-001	wick retainer			2	2				2	2	2	2
20	30370296-004	cable assembly			1		1	1	1	1			
	30370269-007	cable assembly	1	1		1							
	30370296-005	cable assembly										1	
	30370296-008	cable assembly									1		

TABLE 2 - Change Gears and Armature Pinion

Motor Number 30676665-		30735501-	Gear Ratio	Gear "A" & No. of Teeth	Gear "B" & No. of Teeth	Gear "C"& No. of Teeth	Armature Pinion
509	514		10:1	omit	omit	(K) 30735144-001 35T & 34T	(K) 30735144-001 15T
510	515		30:1	(K) 30735144-001 42T & 12T	30364784-000 44T & 28T	(K) 30735144-001 28T	(K) 30735144-001 11T
511		511	1.92:1	omit	(K) 30735144-001 54T & 38T	omit	(K) 30735144-001 22T
512	516	512	5.83:1	omit	omit	30676750-001 35T & 24T	(K) 30735144-001 15T
513			4.4:1	omit	omit	omit	(K) 30735144-001 10T

TABLE 3 - Servo Balancing Motor

Table I or Table II Selection	Proces Multipoint Model 1117/1127	Circular Chart and Scale Model 1112/1116	One or Two Pen Strip Chart Recorder Model 1113	Model 1123
12XXX	30676665–516	30676665–515	30676665–515	30676665–515
22XXX	30676665–516	30676665–515	30676665–515	30676665–515
32XXX	30676665–516	30676665–515	30676665–515	30676665–515
42XXX	30676665–512	30676665–510	30676665–510	30676665–510
52XXX	30676665–512	30676665–510	30676665–510	30676665–510
62XXX	30676665–512	30676665–510	30676665–510	30676665–510
13XXX	30676665–516	30676665–514	30676665–514	30676665–514
23XXX	30676665–516	30676665–514	30676665–514	30676665–514
33XXX	30676665–516	30676665–514	30676665–514	30676665–514
43XXX	30676665–512	30676665–509	30676665–509	30676665–509
53XXX	30676665–512	30676665–509	30676665–509	30676665–509
63XXX	30676665–512	30676665–509	30676665–509	30676665–509
X4XXX	30676665–516	30676665–513		
X5XXX			30676665–513	30676665–511
X9XXX	30676665–516			
1AXXX	30735501–512			
2AXXX	30735501–512			
3AXXX	30735501–512			
4AXXX	30735501–511			
5AXXX	30735501–511			
6AXXX	30735501–511			
XBXXX	30735501–512			

Motor Driven Set Point Feature

Table II Selection	Motor Part Number
42090	30676665–509
42100	30676665–509
42270	30676665–509
43090	30676665–510
43100	30676665–510
43270	30676665–510

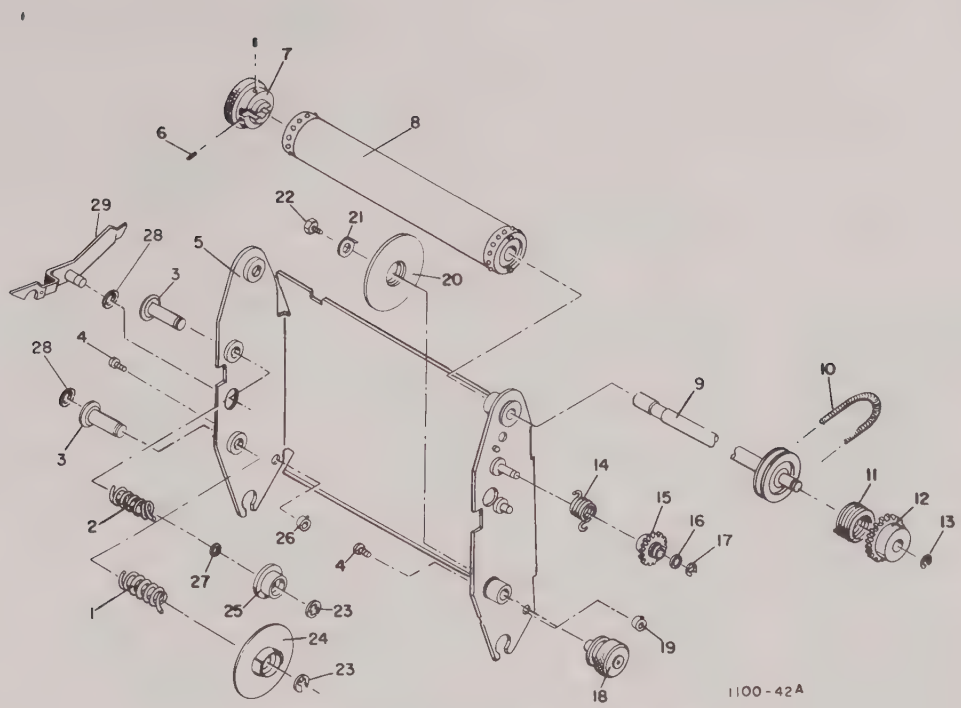

Chart Transport Assembly (Multipoint, 1 & 2 Pen)

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
	30679262-003	chart transport assembly (multipoint)			1	
	30679262-002	chart transport assembly (1 & 2 pen)			1	
1	(K) 30735145-001	thrust spring, L.H.			1	1
2	(K) 30735145-001	thrust spring, R.H.			1	1
3	(K) 30735145-001	shaft, grooved			2	2
4	(K) 30735145-001	screw 10-32 rd. hd. 1/4"			2	2
5	30679261-001	chart platen assembly			1	
6	(K) 30735145-001	set screw bristo socket 5-40 cup point 1/4"			2	4
7	(K) 30735145-001	knob			1	1
8	30723299-004	drum assembly, rubber (multipoint)			1	
	30723299-003	drum assembly, aluminum (1 & 2 pen)			1	
9	30676588-001	shaft assembly			1	
10	30723382-002	garter spring	1	2	1	
11	(K) 30735145-001	clutch spring			1	1
12	(K) 30735145-001	clutch gear			1	1

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ELECTRONIK 111 CHART
TRANSPORT ASSEMBLY, MULTIPOINT,
1 & 2 PEN RECORDER
PARTS LIST

Section 752-34

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
13	(K) 30735145-001	retaining ring			1	4
14	(K) 30735145-001	brake spring			1	1
15	(K) 30735145-001	gear			1	1
16	30006885-000*	washer .128 ID x .219 OD .031 thk			1	
17	30079208-000*	cotter			1	
18	(K) 30735145-001	reroll knob assembly			1	1
19	(K) 30735145-001	stop			1	1
20	(K) 30735145-001	disc, left reroll			1	1
21	(K) 30735145-001	driving washer			1	2
22	30000011-805*	screw 8-32 hex. hd. 5/16"			1	
23	(K) 30735145-001	retaining ring			2	4
24	(K) 30735145-001	disc, right reroll			1	1
25	(K) 30735145-001	holder			1	1
26	(K) 30735145-001	stop			1	1
27	(K) 30735145-001	washer .281 ID x .438 OD .062 thk			1	2
28	(K) 30735145-001	retaining ring			4	4
29	(K) 30735145-001	latch assembly			1	1

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Model 112
Chart Transport Assembly

Parts List

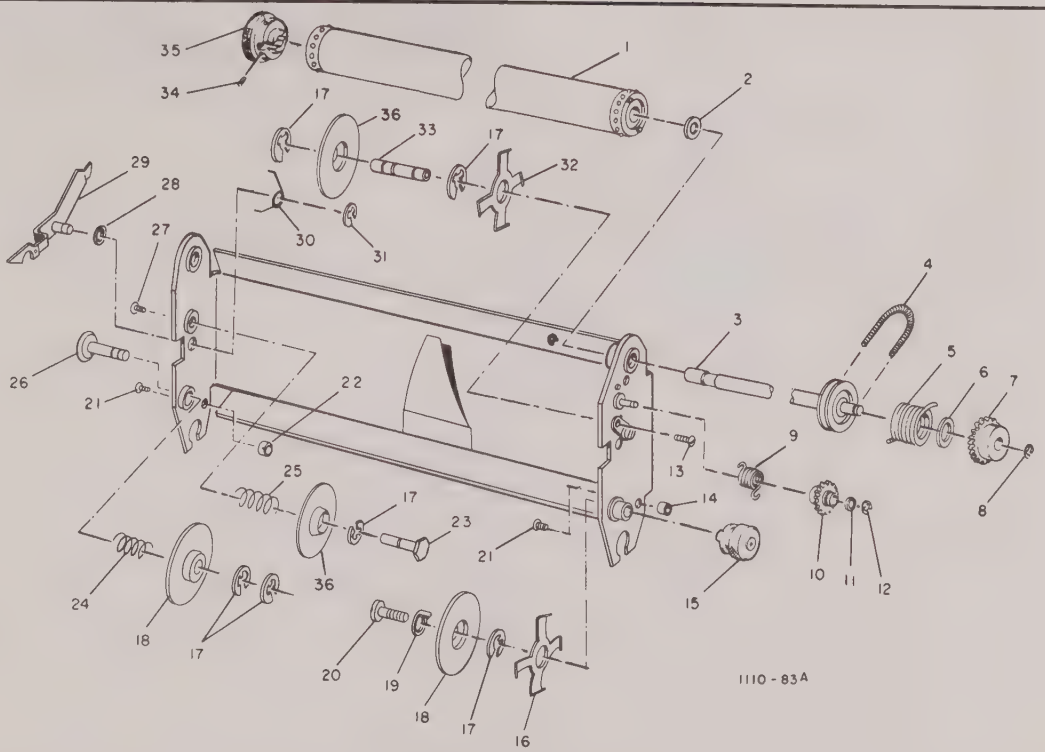

Figure 1 – Chart Transport

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

FIGURE NO. 1

Key	Part	Description	Recom'd Spare Parts Per		Quantity	
			10	100	Unit	Kit
	30679191-001	chart transport assembly (recorder & elec. multipoint			1	
	30679191-002	chart transport assembly (mech. multipoint)			1	
1	30674204-001	drum assembly			1	
	30674204-002	drum assembly (mechanical multipoint)			1	
2	30006532-000*	spacer 255 ID x 50 OD x .062 thk			1	
3	30676588-002	shaft assembly	1	2	1	

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FIGURE NO. 1

Key	Part	Description	Recom'd Spare Parts Per		Quantity	
			10	100	Unit	Kit
4	30723382-502	garter spring			1	
5	(K)30735145-002	clutch spring			1	1
6	(K)30735145-002	tubing, friction			1	1
7	(K)30735145-002	clutch gear			1	1
8	(K)30735145-002	retaining ring			1	4
9	(K)30735145-002	spring, brake				1
10	(K)30735145-002	gear			1	1
11	30006885-000*	washer .1285 ID x 2188 OD x .0312 thk			1	
12	30079208-000*	cotter			1	
13	30000009-603*	screw 6-32 rd. washer hd. 3/16''			1	
14	(K)30735145-002	stop			1	1
15	(K)30735145-002	pulley assembly			1	1
16	(K)30735145-002	spring, disc			1	1
17	(K)30735145-002	retaining ring			6	4
18	(K)30735145-002	disc, reroll			2	1
19	(K)30735145-002	washer, key			1	2
20	30000011-804*	screw 8-32 hex hd. 1/4''			1	
21	(K)30735145-002	screw			2	2
22	(K)30735145-002	stop			1	1
23	(K)30735145-002	pin			1	1
24	(K)30735145-002	thrust spring, left-hand			1	1
25	(K)30735145-002	thrust spring, right-hand			1	1
26	(K)30735145-002	shaft, grooved			1	1
27	(K)30735145-002	screw			1	1
28	(K)30735145-002	washer			1	2
29	(K)30735145-002	latch assembly			1	1
30	(K)30735145-002	spring, latch			1	1
31	30040283-000*	cotter .500 OD x .0156 wall			1	
32	(K)30735145-002	spring, disc			1	1
33	(K)30735145-002	pin			1	1
34	30677073-807*	set screw 8-32 spline socket cup point 7/16''			1	
35	(K)30735145-002	knob			1	1
36	30680294-003	holder, supply roll			1	
	30680294-004	holder, supply roll			1	

Model 111 & 112 Strip Chart Side Plates & Chart Drive Assembly

Parts List

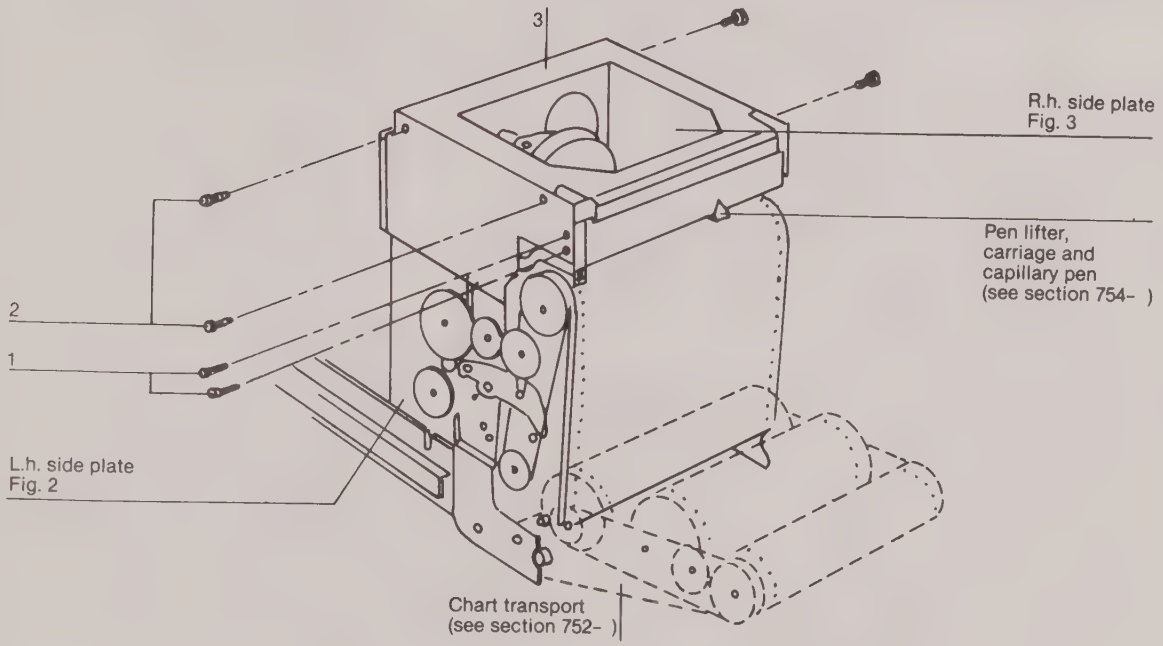

Figure 1 - Display package

IMPORTANT:

1. An asterisked part number indicates that the described part is commercially available. For your convenience all commercially available hardware and electrical components have been put in parts kits which can be ordered by numbers 30734892-001 (hardware) and 30734897-001 (electrical components).

2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

FIGURE NO. 1

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity Per	
			10	100	Unit	Kit
	30676773-TAB	lefthand side plate assembly (see Figure 2)			1	
	30676774-TAB	righthand side plate assembly (see Figure 3)			1	
1	30000007-603*	screw 6-32 flat hd. 3/16"			2	
2	30000007-604*	screw 6-32 flat hd. 1/4"			4	
3	30676891-001	chassis cover (111)			1	
4	30682269-001	chassis cover (112)			1	

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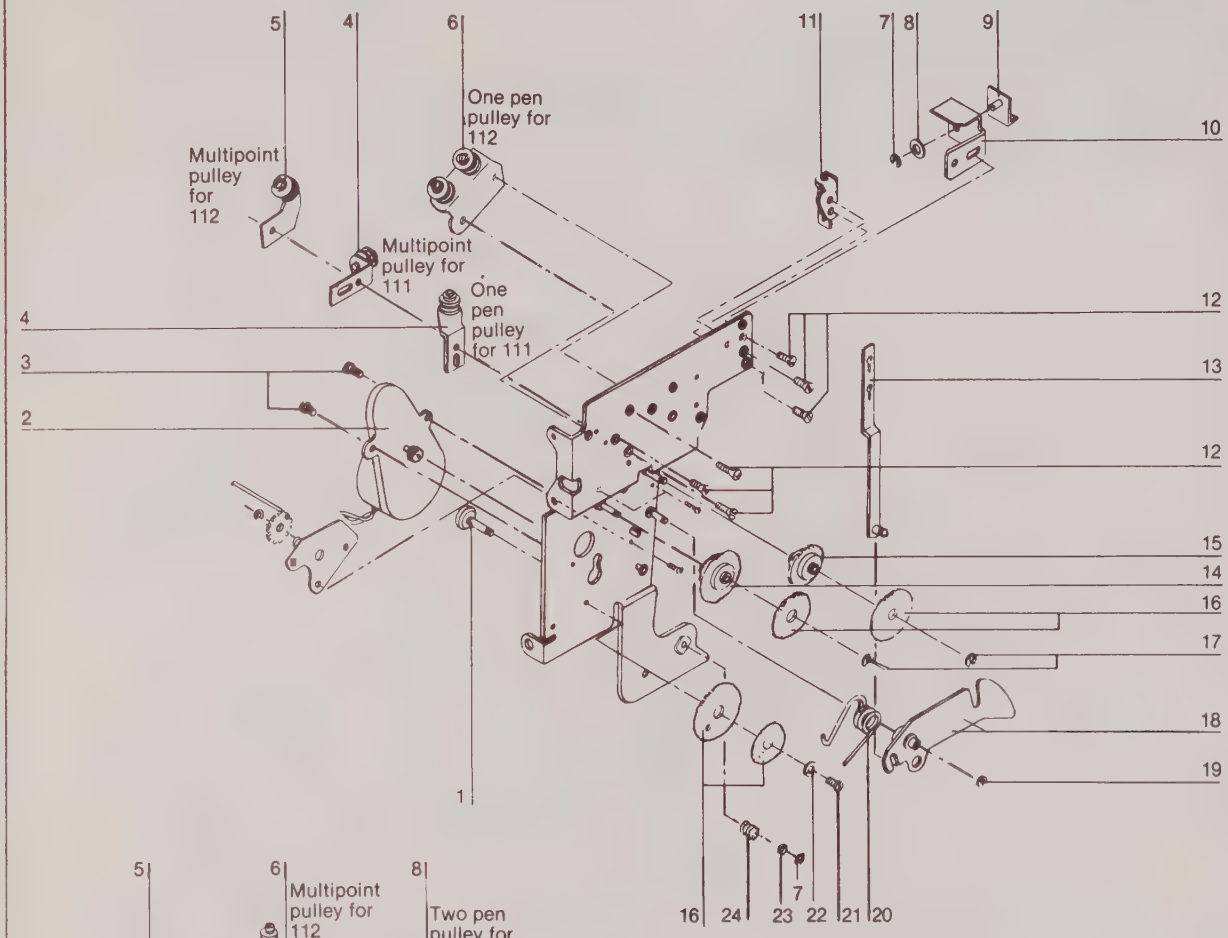

Figure 2 - Left hand side plate assembly

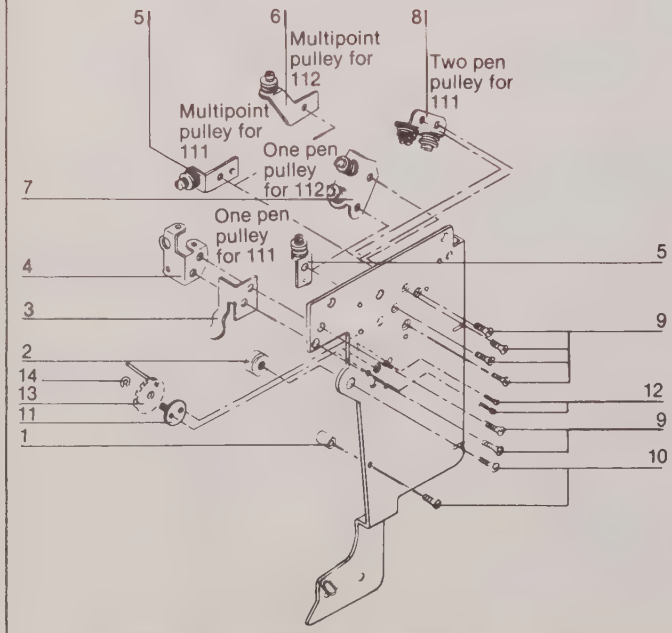

Figure 3 - Right hand side plate assembly

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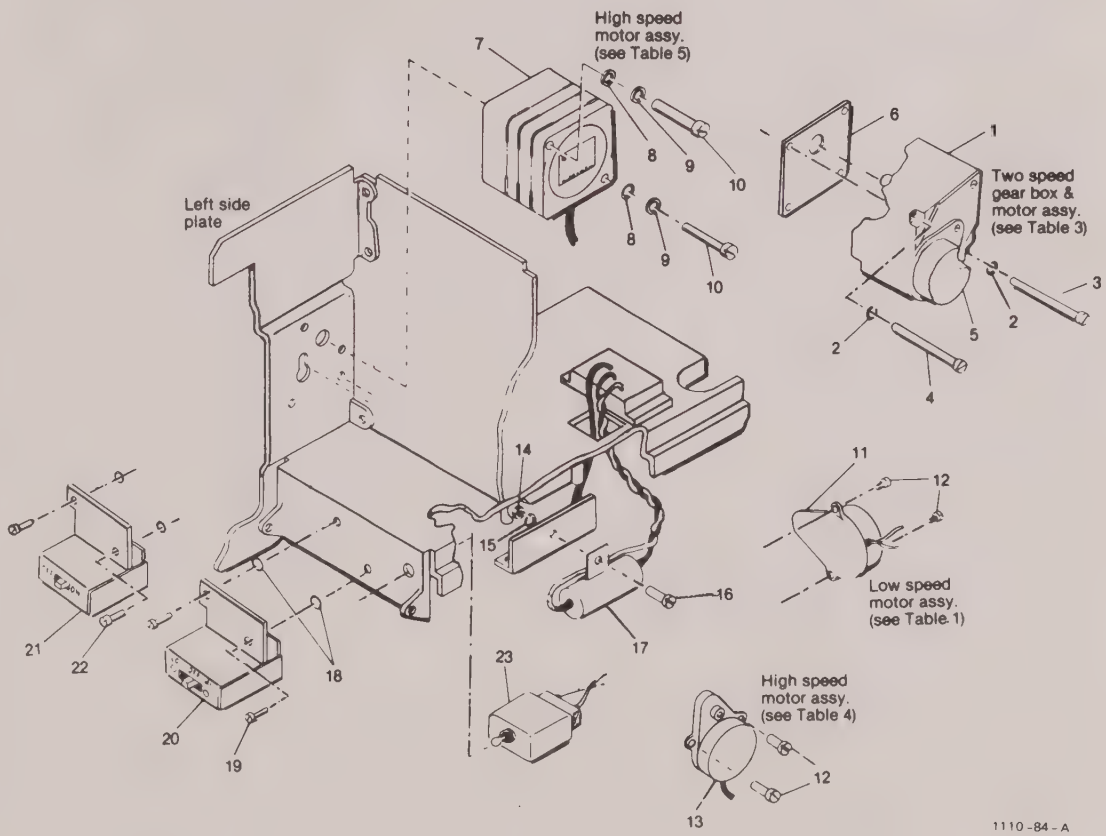

Figure 4 – Chart Drive Motors

FIGURE NO. 2

Key No.	Part No.	Description	Recom'd Per Spare Parts		Quantity Per Unit 30676773-					Kit
			10	100	001	004	005	006	007	
	30676773-001	LH side plate – one & two servo 111			1					
	30676773-004	LH side plate – one servo 112				1				
	30676773-005	LH side plate – multipoint 112					1			
	30676773-006	LH side plate – mech. multipoint 111						1		
	30676773-007	LH side plate – mech. multipoint 112							1	
1	(K) 30734830-001	pin			1	1	1	1	1	1
2	see Figure 4	chart drive motor	1	2	1	1	1	1	1	
3	30000005-403*	screw 4-40, bdg. hd. 3/16"			2	2	2	2	2	
4	(K) 30734833-001	bracket assembly with pulley			1	–	–	1	–	1
5	(K) 30734832-001	bracket assembly with pulley			–	–	1	–	1	1
6	(K) 30734832-001	bracket assembly with pulley			–	1	–	–	–	1
7	(K) 30734830-001	retaining ring			1	1	1	1	1	1
8	(K) 30734832-001	spring washer				–	1	–	–	4
9	(K) 30734832-001	mounting plate assembly			–	–	1	–	1	1
10	(K) 30734832-001	bracket					1	–	–	1
11	(K) 30734831-001	latch bracket			–	–	–	1	1	1
12	30000012-603*	screw 6-32 flt. hd. 3/16"			1	2	3	3	3	
13	(K) 30734831-001	lever			1	1	–	–	–	1
14	(K) 30734830-001	gear assembly, change gear hub 60T, 48DP			1	1	1	1	1	1
15	(K) 30734833-001	gear assembly, change gear hub 28T, 31DP			–	–	1	–	1	1
	(K) 30734832-001	gear 32T, 32DP			–	1	1	–	1	1
16	30676716-item	change gear (see Table 2)								
17	30007403-000*	external cotter			2	2	2	2	2	
18	(K) 30734830-001	latch assembly	1		1	1	1	1		1
19	30079208-000*	external cotter			1	1	1	1	1	
20	(K) 30734830-001	spring torsion			1	1	1	1	1	1
21	30000005-004*	screw 10-32 phlps. hd. 1/4"			1	1	1	1	1	
22	30004971-000*	washer .195 ID x .420 OD x .036 THK			1	1	1	1	1	
23	30678073-001*	washer .128 ID x .234 OD x .010 THK			1	1	1	1	1	
24	(K) 30734830-001	spring			1	1	1	1	1	1
25	30735598-001	plate assembly			–	–	–	1	1	
26	30679871-001	gear assembly (60T)			–	–	–	1	1	
27	(K) 30734830-001	retaining ring			–	–	–	1	1	2

FIGURE NO. 3

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity Per Unit 30676774-					Kit
			10	100	001	004	005	006	007	
	30676774–001	RH side plate – one & two pen 111			1					
	30676774–004	RH side plate – one pen 112				1				
	30676774–005	RH side plate – multipoint 112					1			
	30676774–006	RH side plate – mech. multipoint M.P. 111						1		
	30676774–007	RH side plate – mech. multipoint M.P.112							1	
1	(K) 30734832–001	stop			1	1	1	1	1	1
2	(K) 30734830–001	guide bushing			1	1	1	–	–	1
	(K) 30734830– 001	guide bushing (mech. multipoint)			–	–	–	1	1	1
3	(K) 30734832–001	spring, scale latch			–	–	1	–	–	1
4	(K) 30734831–001	bracket			1	1	–	1	1	1
5	(K) 30734833–001	bracket assembly with pulley			1	–	–	1	–	1
6	(K) 30734832–001	bracket assembly with pulley			–	–	1	–	1	1
7	(K) 30734831–001	bracket assembly with pulley			–	1	–	–	–	1
8	(K) 30734831–001	bracket assembly with pulley			1	–	–	–	–	1
9	30000012–603*	screw 6–32 flat hd. 3/16"			3	4	3	3	3	
10	30000012–605*	screw 6–32 flat hd. 5/16"			1	2	2	2	2	
11	30682654–001	bearing			–	–	–	1	1	
12	30000012–403*	screw 4–40, flat hd. 3/16"			–	–	–	4	4	
13	30735402–001	gear assembly 60T			–	–	–	1	1	
14	(K) 30734830–001	retaining ring			–	–	–	1	1	2

FIGURE NO. 4

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity Per	
			10	100	Unit	Kit
1	30680265–item	2 speed gear box and motor assy. (see Table 3)			1	
2	30000926–000*	lockwasher #6			2	
3	30000080–028*	bolt 10–32 fil. hd. 1 3/4"			1	
4	300000080–020*	bolt 10–32 fil. hd. 1 3/8"			1	
5	30680268–item	gear motor assembly (see Table 3)	1	2	1	
6	(K) 30734830–001	spacer plate			1	1
7	30676740–item	motor assembly (hi speed, see Table 5)	1	2	1	
8	30009634–000*	washer .203 ID X .312 OD X .064 THK			2	
9	30000925–000*	lockwasher #10			2	
10	30000006–038*	screw 10–32 rd. hd. 2 3/8"			2	
11	30370498–item	motor assembly (low speed, see Table 1)	1	2	1	
12	30000005–603*	screw 6–32 bdg. hd. 3/16"			2	
13	30677496–item	motor assembly (hi speed, Table 4)	1	2	1	
14	30351600–000*	hex nut 4–40			1	
15	30000930–000*	lockwasher #4			1	
16	30000005–404*	screw 4–40 bdg. hd. 1/4"			1	
17	30677498–item	capacitor assembly (see Table 4 & 5)			1	
18	(K) 30734830–001	spacer			2	2
19	30000005–807*	screw 8–32 bdg. hd. 7/16"			2	
20	30680263–002	switch assembly, two speed chart drive			1	
21	30682332–002	switch, chart drive 112, single speed (option on one & two pen, standard on multipoint)			1	
22	30000005–805*	screw 8–32, bdg. hd. 5/16"			2	
23	30676832–005	switch, chart drive 111, single speed (option on one & two pen, standard on multipoint)			1	

TABLE 1

Chart Drive Motor 120V 50/60 Hz - Low speed

Part No.	Chart Speed	RPM
30370498–023	1"/hr	1/40
30370498–024	2"/hr	1/20
30370498–025	6"/hr	3/20
30370498–026	10"/hr	1/4
30370498–027	12"/hr	3/10
30370498–028	20"/hr	1/2
30370498–029	30"/hr	3/4
30370498–030	60"/hr	1–1/2

TABLE 2

Chart Speed Change Gears 120 Volts

Use	Gear No.	Teeth	Ratio	Hertz
2	(K) 30734834–001	60T	1:1	60
1	(K) 30734834–001	80T	2:1 or	60
1	(K) 30734834–001	40T	1:2	60
1	(K) 30734834–001	45T	1:2	50
1	(K) 30734834–001	75T		50
1	(K) 30734834–001	84T	2:1	50
1	(K) 30734834–001	35T		50
1	(K) 30734834–001	66T	1:1	50
1	(K) 30734834–001	55T		50

TABLE 3

2 Speed Gear Box & Motor Assembly (120V / 50/60 Hz)
(See Section 758-) for detail parts of gear box only

Assembly No.	Basic Chart Speed	Jump Speed	Ratio	Gear Box Only	Motor Only	RPM
30680265–021	10"/hr.	1"/hr	10:1	30680266–002	30680268–010	2.5
30680265–020	20"/hr	2"/hr	10:1	30680266–002	30680268–009	5.
30680265–019	60"/hr	6"/hr	10:1	30680266–002	30680268–007	15
30680265–018	120"/hr	12"/hr	10:1	30680266–002	30680268–006	30
30680265–024	30"/hr	0.5"/hr	60:1	30680266–001	30680268–008	7.5
30680265–023	60"/hr	1"/hr	60:1	30680266–001	30680268–007	15
30680265–022	120"/hr	2"/hr	60:1	30680266–001	30680268–006	30

TABLE 4

Chart Drive Motor 120V 50/60 Hz - Hi speed

Part No.	Chart Speed	RPM	Capacitor Assembly
30677496–008	2"/min.	3	30677498–005
30677496–009	4"/min.	6	30677498–005
30677496–010	6"/min.	9	30677498–005
30677496–011	10"/min.	15	30677498–005
30677496–017	12"/min.	18	30677498–005

TABLE 5

Chart Drive Motor (Stack Type)
(See Section 759- for detail parts of motor) - Hi speed

Part No.	Chart Speed	Ratio	RPM	Hz	Capacitor Assembly
30676740–015	20"/min.	60:1	30	60	30677498–006
30676740–014	30"/min.	40:1	45	60	30677498–006
30676740–015	20"/min.	60:1	30	50	30677498–007
30676740–014	30"/min.	40:1	45	50	30677498–007

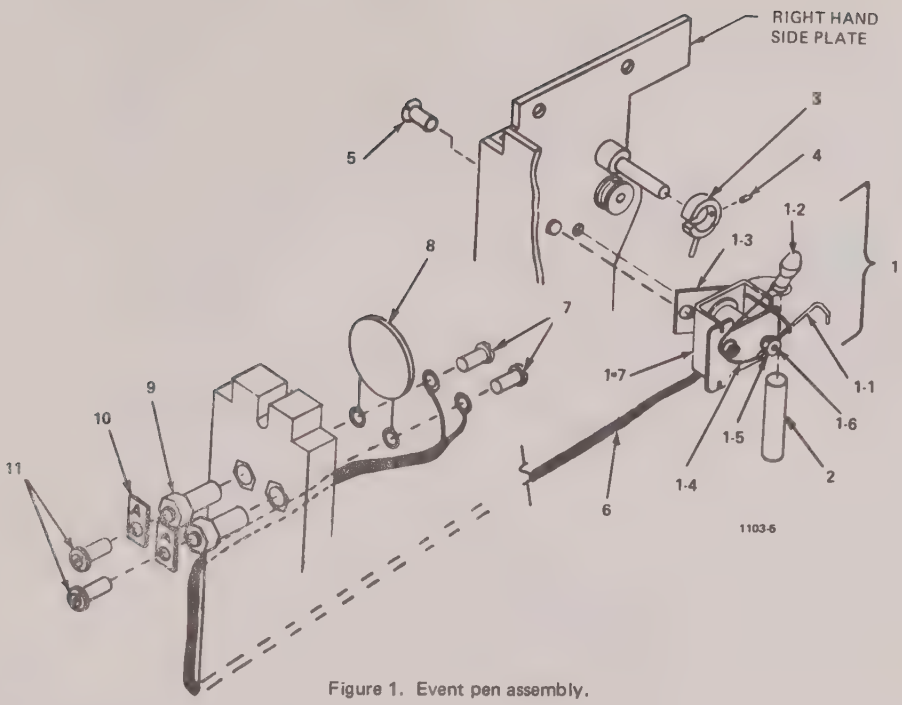

Figure 1. Event pen assembly.

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
1	30676956-003	event pen assy. 115 Vac			1	
	30676956-004	event pen assy. 24 Vdc			1	
1-1	30676939-001	pen tip	1	2	1	
1-2	30687597-001	priming bult	1	2	1	
1-3	(K) 30734825-001	bracket			1	1
	30000005-403*	mtg. screw 4-40 bd. hd. 3/16"			1	
	30360900-001*	lockwasher			1	
1-4	30676949-001	capillary ink tube	1	2	1	
1-5	(K) 30734825-001	hub			1	1
	30079208-000*	external cotter			1	
1-6	(K) 30734825-001	set screw			1	2
1-7	30677401-001	frame and solenoid assy. (115V)			1	
	30677401-002	frame and solenoid assy. (24V)			1	
2	(K) 30734825-001	ink cartridge			1	2
3	(K) 30734825-001	collar			1	1
4	30040889-001*	set screw			1	
5	30000012-603*	screw 6-32 flt. hd. 3/16"			1	

756-0012-111

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Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10 100	Quantity Unit	Quantity Kit
6	(K) 30734825-001	cable assy. elec.		1	1
7	30000005-803*	screw 8-32 bd. hd. 3/16"		1	
8	(K) 30734825-001	capacitor assembly		1	1
9	(K) 30734825-001	connector		2	1
10	(K) 30734823-001	marker (see Table 1)		2	4
11	30000009-806*	screw 8-32 washer head 3/8"		2	

TABLE 1

Available Marker Characters**		
A	H	P
B	J	R
C	K	S
D	L	T
E	M	U
F	N	

** these markers available in Kit 30734823-001

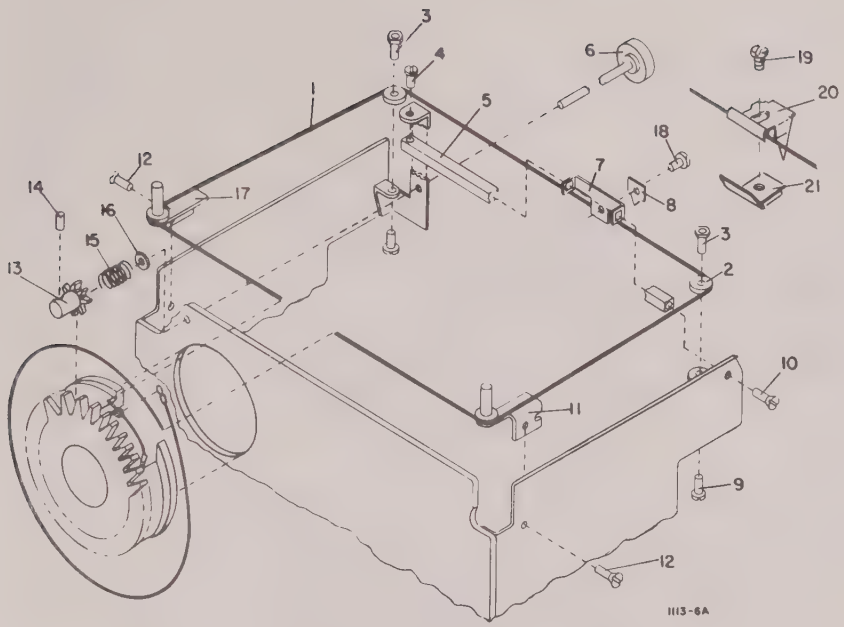

Figure 1. Set Point and Cables, Strip Chart Instrument 111

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
1	30676862-003	drive cable assembly, index	1	3	1	
2	(K) 30733965-001	pulley, ball bearing			2	2
3	(K) 30733965-001	stud			2	2
4	30000005-203*	screw 2-56 bdg. hd. 3/16"**			1	
5	(K) 30733965-001	rail**			1	1
6	(K) 30733965-001	knob & shaft assembly, index pointer**			1	1
	(K) 30733965-001	knob & shaft assembly, index pointer (multipoint only)			1	1
7	(K) 30733965-001	pointer, set pointer index**			1	1
8	(K) 30733965-001	clamp, cable**			1	10
9	30000005-403*	screw 4-40 bdg. hd. 3/16"			2	
10	30000007-203*	screw 2-56 flat hd. 3/16"**			16	
11	(K) 30733965-001	bracket & pulley assembly, left hand			1	1
12	30000007-403*	screw 4-40 flat hd. 3/16"			2	
13	(K) 30733965-001	gear & hub assembly			1	1
14	30040958-001*	set screw 5-40 x 1/8 bristo socket			1	
15	(K) 30733965-001	spring			1	2

** not used with multipoint

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Figure No. 1 & 2 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
16	30006538-000*	washer .1300 ID x .250 OD x 0149 thk			1	
17	(K) 30733965-001	bracket & pulley assembly, right hand			1	1
18	30000005-402*	screw 4-40 bdg. hd. 1/8"**			1	
19	30000005-202*	screw 2-56 bdg. hd. 1/8" (multipoint only)			1	
20	(K) 30733965-001	pointer (multipoint only)			1	1
21	(K) 30733965-001	pointer bracket assembly (multipoint only)			1	1

Figure No. 2 Key No.	Part No.	Description				
1	30000007-403*	screw 4-40 flat hd. 3/16"			4	
2	(K) 30733965-001	bracket & pulley assembly, left hand			1	1
3	30676862-006	drive cable assembly, index	1	3	1	2
4	(K) 30733965-001	stud			1	2
5	(K) 30733965-001	pulley			4	
6	30000005-402*	screw 4-40 bdg. hd. 1/8"			2	
7	30000005-404*	screw 4-40 flat hd. 1/4"			1	
8	(K) 30733965-001	pointer, index			1	1
9	(K) 30733965-001	knob & shaft assembly			1	1
10	30009748-000*	cotter			1	
11	30006538-000*	washer .1300 ID x .250 OD x .0149 thk			1	
12	(K) 30733965-001	bracket & pulley assembly, right hand			1	1
13	(K) 30733965-001	spring			1	2
14	(K) 30733965-001	gear & hub assembly			1	1
15	30040958-001*	set point 5-40 x 1/8 bristo socket			1	

** not used with multipoint

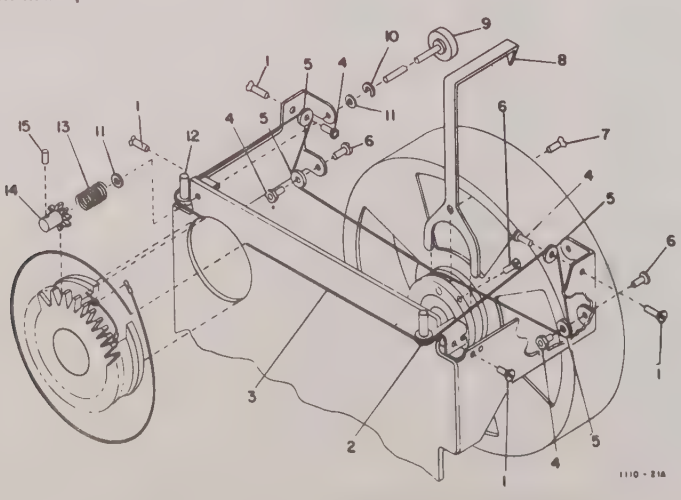

Figure 2. Set Point and Cables, Circular Instruments 111

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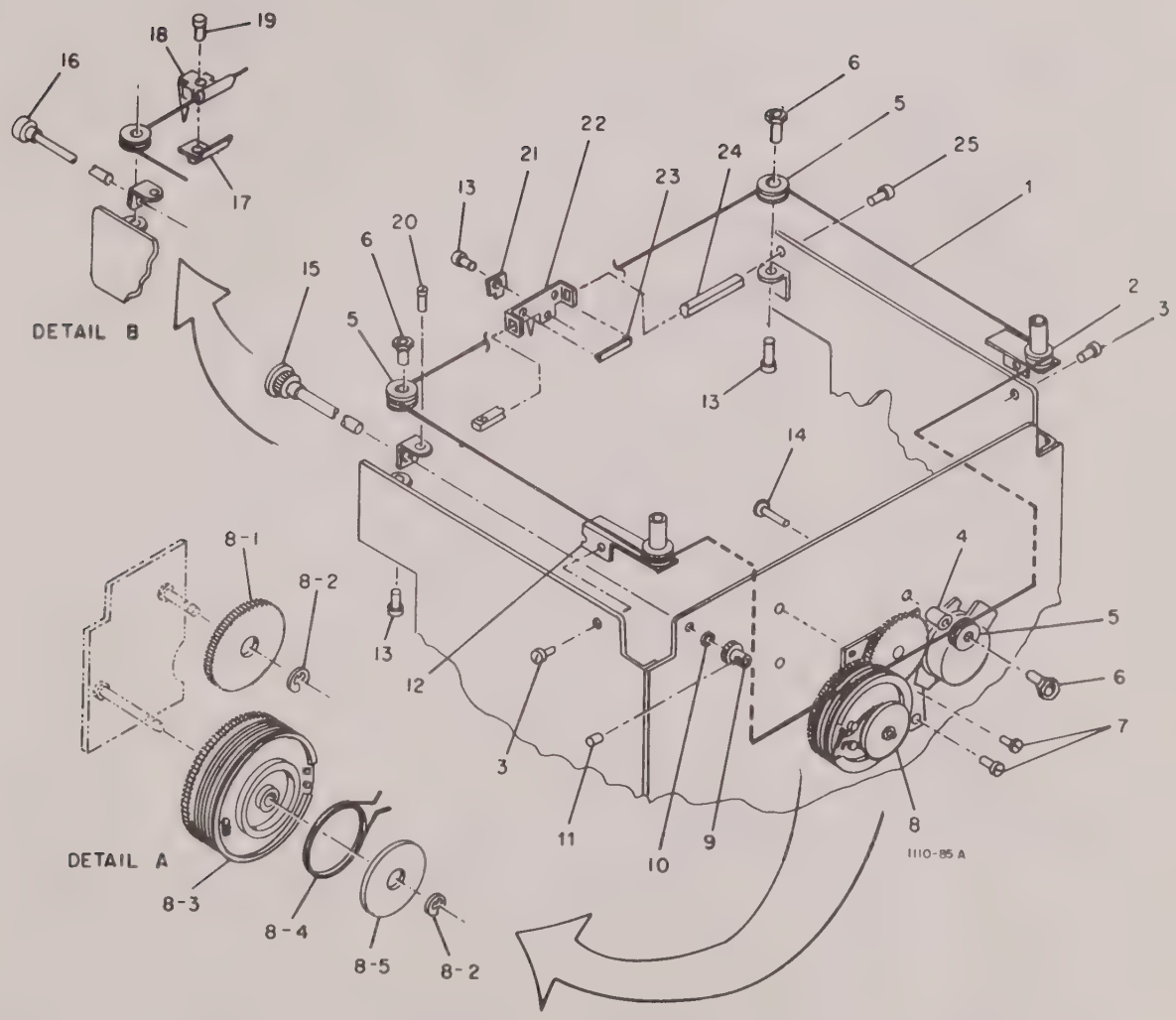

Figure 3. Set Point & Cables Strip Chart 112

763-0014-110

Figure No. 3 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
1	30676862-009	drive cable assembly, index	1	3	1	
2	(K) 30733965-001	bracket & pulley assembly			1	1
3	30000007-403*	screw 4-40 flat hd. 3/16"			2	
4	(K) 30733966-001	spacer			1	1
5	(K) 30733965-001	pulley			3	2
6	(K) 30733965-001	stud			3	2
7	30000005-603*	screw 6-32 bdg. hd. 3/16"			2	
8	30679176-001	drum & gear assy. (see detail A)			1	

Figure No. 3 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
8-1	(K) 30733966-001	gear assembly			1	1
8-2	30007403-000*	cotter			2	
8-3	30679167-001	cable drum assembly			1	
8-4	(K) 30733966-001	spring			1	1
8-5	(K) 30733966-001	washer			1	3
9	(K) 30733966-001	gear & hub assembly			1	1
10	30006538-000*	washer .1300 ID x .250 OD x .0149 THK			1	
11	(K) 30733966-001	set screw			1	3
12	(K) 30733966-001	bracket & pulley assembly			1	1
13	30000005-403*	screw 4-40 bdg. hd. 3/16"			2	
14	30000005-414*	screw 4-40 bdg. hd. 7/8"			1	
15	(K) 30733965-001	knob & shaft assembly			1	1
16	(K) 30733965-001	knob & shaft assembly**			1	1
17	(K) 30733965-001	pointer bracket assembly**			1	1
18	(K) 30733965-001	pointer**			1	1
19	30000005-202*	screw 2-56 bdg. hd. 1/8"**			1	
20	30000005-203*	screw 2-56 bdg. hd. 3/16"			1	
21	(K) 30733965-001	clamp			1	10
22	(K) 30733965-001	pointer			1	1
23	(K) 30733966-001	spring			1	2
24	(K) 30733966-001	rail			1	1
25	30000007-203*	screw 2-56 flat hd. 3/16"			1	

** used with multipoint instrument only.

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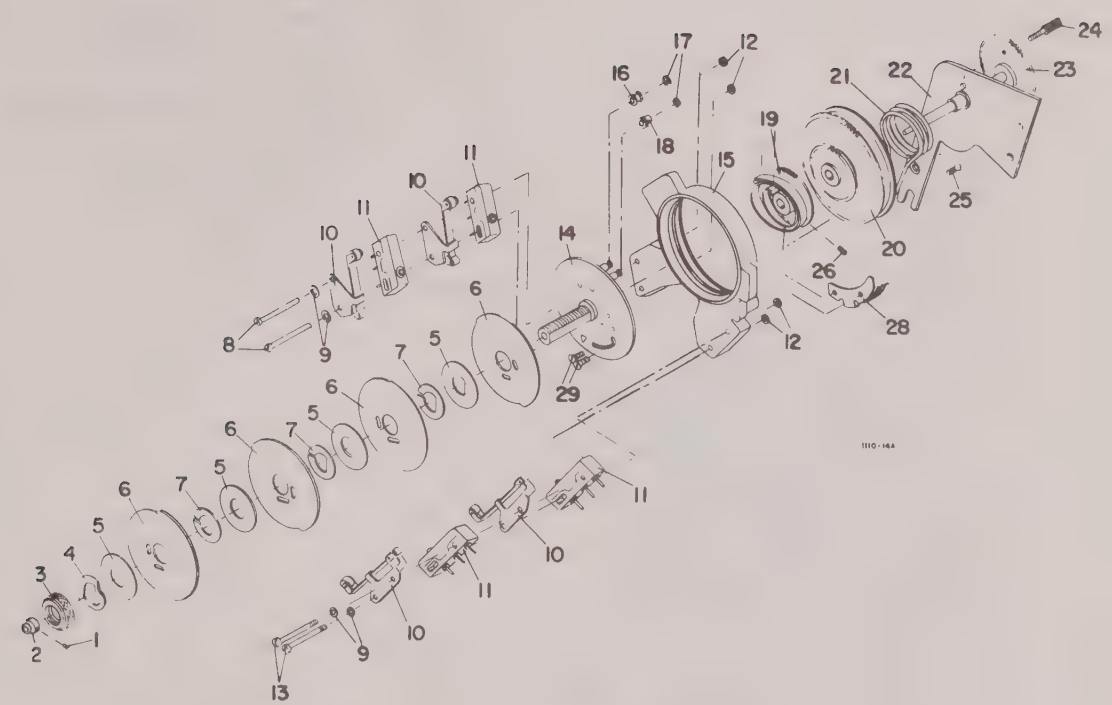

Figure 1. Front Set Contact and Proportional Control.

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each)
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit 30676880- 501	502	503	504	505	506	507	508	509	510	Kit
	30676880-501	proportional control mechanism			1										
	30676880-502	proportional control mechanism w/1 switch				1									
	30676880-503	proportional control mechanism w/2 switches					1								
	30676880-504	proportional control mechanism w/3 switches						1							
	30676880-505	proportional control mechanism w/4 switches							1						
	30676880-506	contact control mechanism w/1 switch								1					
	30676880-507	contact control mechanism w/2 switches									1				
	30676880-508	contact control mechanism w/3 switches										1			
	30676880-509	contact control mechanism w/4 switches											1		
	30676880-510	contact control mechanism, error generator												1	
1	(K) 30733964-001	bristo set screw 2-56			1	1	1	1	1	1	1	1	1	1	5
2	(K) 30733964-001	retaining collar			1	1	1	1	1	1	1	1	1	1	2
3	(K) 30733964-001	thumb nut			–	1	1	1	1	1	1	1	1	–	2
4	(K) 30733964-001	spring washer			–	1	1	1	1	1	1	1	1	–	2

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ELECTRONIK 111 & 112
ELECTRIC FRONT-SET CONTACT AND PROPORTIONAL CONTROL PARTS LIST

Section 766-9

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit 30676880- 501	502	503	504	505	506	507	508	509	510	Kit
5	(K) 30733964-001	spacer			–	1	2	3	4	1	2	3	4	–	4
6	(K) 30733964-001	cam			–	1	2	3	4	1	2	3	4	–	4
7	(K) 30733964-001	spacer			–	–	1	2	3	–	1	2	3	–	3
8	30000006-212*	screw 2-56 rd. hd. 3/4"			–	–	2	2	–	–	2	2	–	–	
	30720010-216*	screw 2-56 rd. hd. 1"			–	–	–	–	2	–	–	–	2	–	
9	30364604-000*	lockwasher, shakeproof internal tooth #2	1	2	–	2	4	4	4	2	4	4	4	–	
10	30371164-501	actuator arm	1	2	–	1	2	3	4	1	2	3	4	–	
11	30676926-501	micro switch			–	1	2	3	4	1	2	3	4	–	
12	30004900-000*	hex nut 2-56			–	2	4	4	4	2	4	4	4	–	
13	30000006-210*	screw 2-56 rd. hd. 5/8"			–	2	2	–	–	2	2	–	–	–	
	30720010-214*	screw 2-56 rd. hd. 7/8"			–	–	–	2	2	–	–	2	2	–	
14	30676877-001	differential disc assembly			1	1	1	1	1	1	1	1	1	1	
15	30676920-001	slidewire housing			–	–	–	–	–	1	1	1	1	1	
	30677259-001	slidewire & housing assembly	–	1	1	1	1	1	1	–	–	–	–	–	
16	30676884-001	gear – 18T - 64D.P.			1	1	1	1	1	1	1	1	1	1	
17	(K) 30733964-001	retaining ring			2	2	2	2	2	2	2	2	2	2	5
18	(K) 30733964-001	gear – 18T - 64D.P.			1	1	1	1	1	1	1	1	1	1	1
19	30676883-001	gear – (72T) & hub assembly			1	1	1	1	1	1	1	1	1	1	
20	(K) 30733964-001	cable drum & gear assembly			1	1	1	1	1	1	1	1	1	1	1
21	(K) 30733964-001	torsion spring			1	1	1	1	1	1	1	1	1	1	1
22	30676909-001	differential mounting plate subassembly			1	1	1	1	1	1	1	1	1	1	
23	30676869-001	control gear & shaft assembly			1	1	1	1	1	1	1	1	1	1	
24	(K) 30733964-001	differential locking pin			1	1	1	1	1	1	1	1	1	1	1
25	30000012-604*	screw 6-32 flat hd. 1/4"			2	2	2	2	2	2	2	2	2	2	
26	30040889-001*	socket set screw 5-40			1	1	1	1	1	1	1	1	1	1	
27	(K) 30733964-001	torsion spring			1	1	1	1	1	1	1	1	1	1	1
28	30677257-001	contactor assembly	1	2	1	1	1	1	1	–	–	–	–	–	
29	30000005-204*	screw 2-56 bdg. hd. 1/4"			2	2	2	2	2	–	–	–	–	–	

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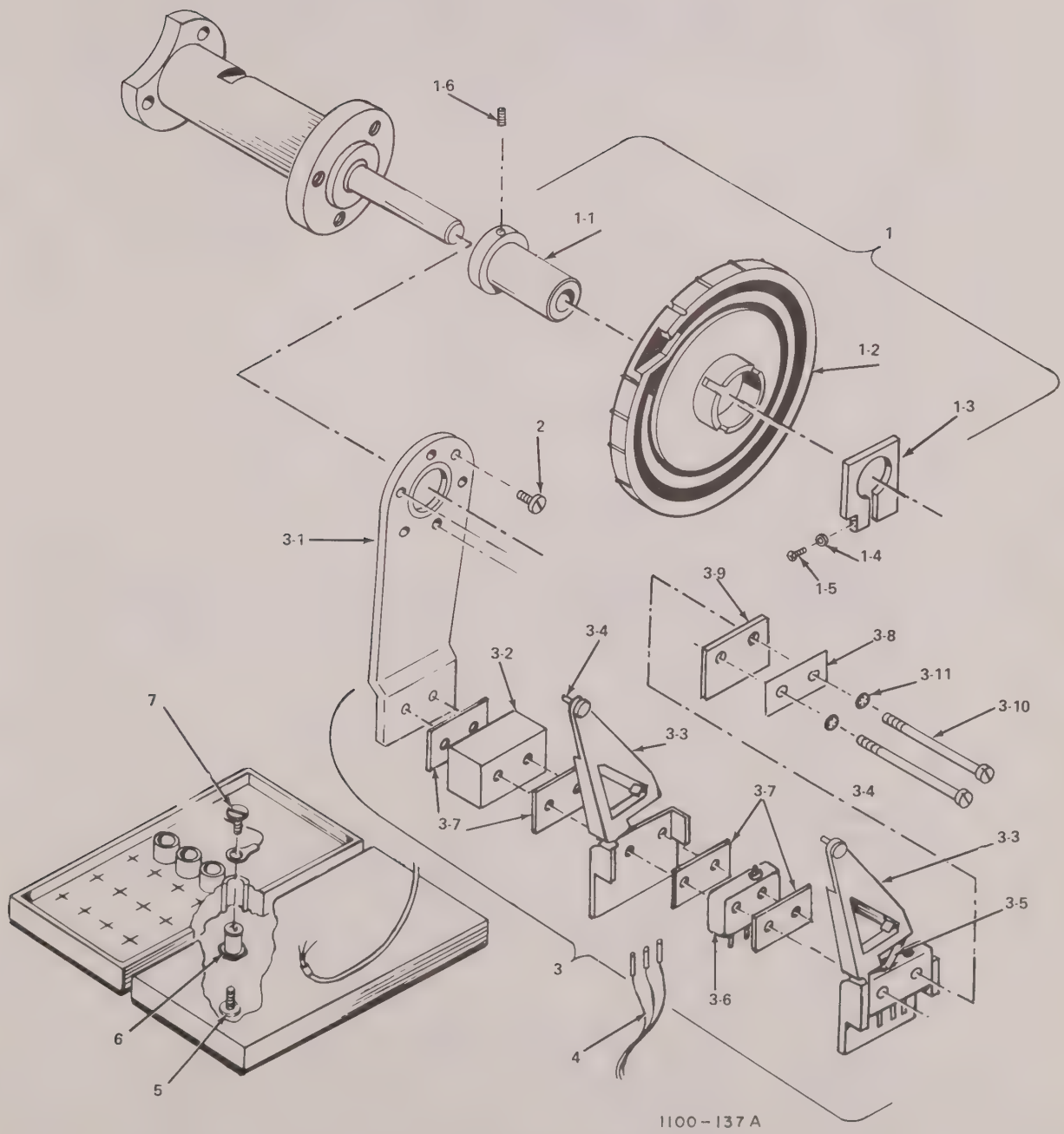

Figure 1. Backset Micro Switch & Mounting Hardware

772-0017-110

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ELECTRONIK 111, 112
BACKSET SWITCH WITH
PLASTIC CAM & ACTUATOR
PARTS LIST

Section 772-17

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897-001 (electrical components - 1 each) and 30734892-001 (hardware - 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

Figure No. 1 Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Unit	Quantity Kit
1	30679200-001	1 cam, 1 hub & 1 clamp assembly			1	
	30679200-002	2 cams, 1 hub & 1 clamp assembly			1	
	30679200-003	3 cams, 1 hub & 3 clamp assembly			1	
	30679200-004	4 cams, 1 hub, & 4 clamp assembly			1	
1-1	30677159-003	hub (for 1 cam)			1	
	30677159-002	hub (for 2 cams)			1	
	30677159-001	hub (for 3 or 4 cams)			1	
1-2	(K) 30734896-001	cam			1	1
1-3	(K) 30734896-001	clamp			1	1
1-4	30372005-001*	lockwasher #4			1	
1-5	30000080-410*	screw 4-40 fil. hd. 5/8"			1	
1-6	30040958-003*	set screw 5-40 6 spline 1/4"			1	
2	30000006-804*	screw 8-32 bd. hd. 1/4"			3	
3	30679267-001	1 switch assembly			1	
	30679267-002	2 switch assembly			1	
	30679267-003	3 switch assembly			1	
	30679267-004	4 switch assembly			1	
	30679267-005	2 hermetically sealed switch & cable ass'y			1	
3-1	(K) 30734896-001	switch mtg. bracket			1	1
3-2	(K) 30734896-001	metal spacer (use 2 for 1 cam; use 1 for dual cam & 1 for sealed unit)			as req'd	1
	(K) 30734896-001	metal spacer (for 3 & 4 cam units)			1	2
3-3	(K) 30734896-001	plastic actuator			1	1
3-4	(K) 30734896-001	actuator pin			1	1
3-5	(K) 30734896-001	actuator spring (used on all but sealed unit)			1	1
	30732559-002	actuator spring (used on sealed unit)			1	
3-6	30676926-001	micro switch	1	4	1	
	30677163-001	sealed switch & cable	2	8	1	
3-7	(K) 30734896-001	insulator			2 per sw.	6
3-8	(K) 30734896-001	end plate			1	3
3-9	(K) 30734896-001	cover for switch			1	1
3-10	30372061-item	mtg. screw 2-56 slot head, used on:			2	
	(K) 30734896-001	1 & 4 backset switches				1
	(K) 30734896-001	2 backset switches & sealed unit				1
	(K) 30734896-001	3 backset switches				1
3-11	30006581-000*	lockwasher .123 OD x .088 ID x 020 wall			2	
4	(K) 30677413-004	cable (switch to chassis connector)			1	1
5	30000009-806*	screw 8-32 washer head 3/8"			3	
6	(K) 30734896-001	terminal			3	3
7	30000005-803*	screw 8-32 bd. hd. 3/16"			3	

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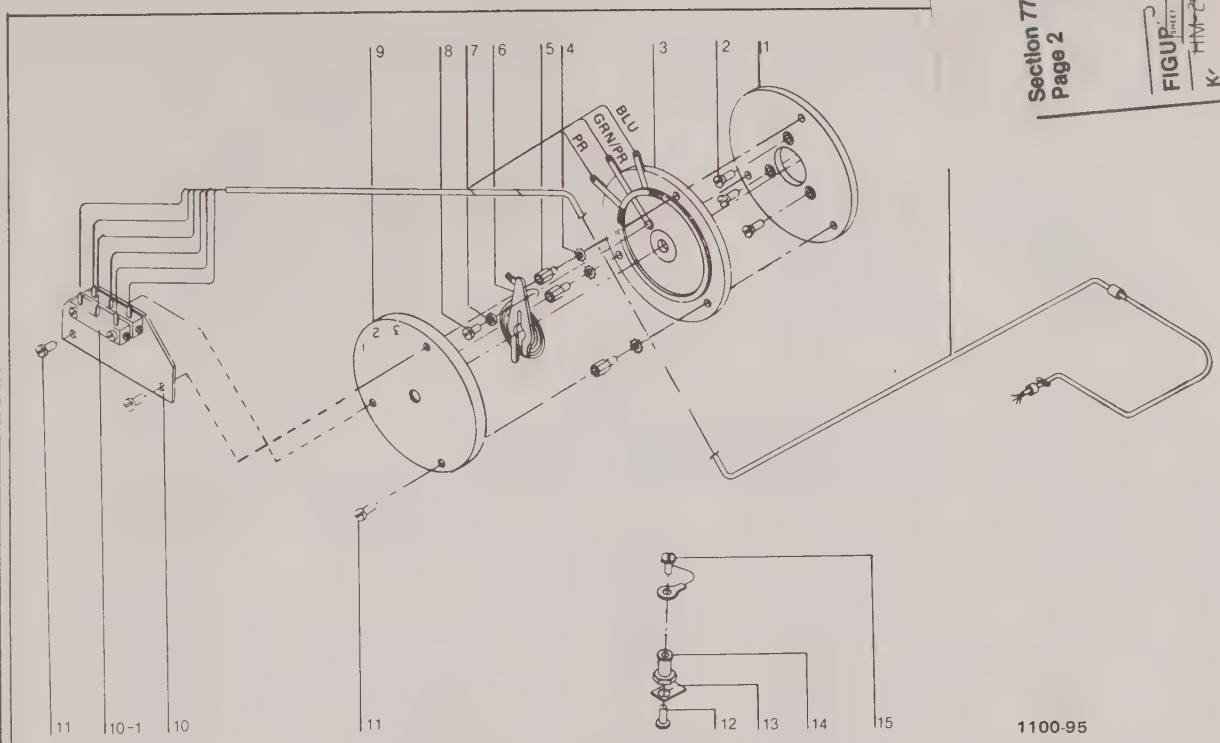

Figure 1 – Transmitting slidewire.

IMPORTANT

1. An asterisked part number indicates that the described part is commercially available. For your convenience, all commercially available hardware and electrical components have been put in parts kits which can be ordered by part number 30734897–001 (electrical components – 1 each) and 30734892–001 (hardware – 10 each).
2. "(K)" denotes that the part number is for the parts kit in which the described part is included. The described part cannot be ordered separately.

FIGURE NO. 1

Key No.	Part No.	Description	Recom'd Spare Parts Per		Quantity Per	
			10	100	Unit	Kit
1	(K) 30734822–001	plate for mtg. slidewire			1	1
2	30000012-806*	screw 8-32 flat Head 3/8			3	
3	see Table 1	slidewire			1	
4	(K) 30734822-001	lockwasher			3	6
5	(K) 30734822-001	stud			3	3
6	30677501-501	contact arm assembly			1	
7	30005900-000*	washer .25 OD x .089 ID x .016 wall			1	
8	30000005-502*	screw 2-32 bd. hd. 1/8"			1	
9	(K) 30734822-001	cover assembly			1	1
10	see Table 1	variable resistor assembly			1	
10–1	see Table 1	resistor			1	
11	30000005–403*	screw, 4-40 bd. hd. 3/16"			2	
12	30000009–806*	screw, 8-32 wshr. hd. 3/8"			1 ea.	

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E NO. 1 (continued)

Key No.	Part No.	Description	Recom'd Spare Parts Per 10	Recom'd Spare Parts Per 100	Quantity Per Unit	Quantity Per Kit
13	(K) 30734823-001	marker, see Table 3			1 ea.	1
14	(K) 30734822-001	terminal connector			1	1
15	3000005-803*	screw, 8-32 bd. hd. 3/16"			1 ea.	
16	see Table 2	cable assembly			1	

TABLE 1 - TRANSMITTING SLIDEWIRE & VARIABLE RESISTOR ASSEMBLY

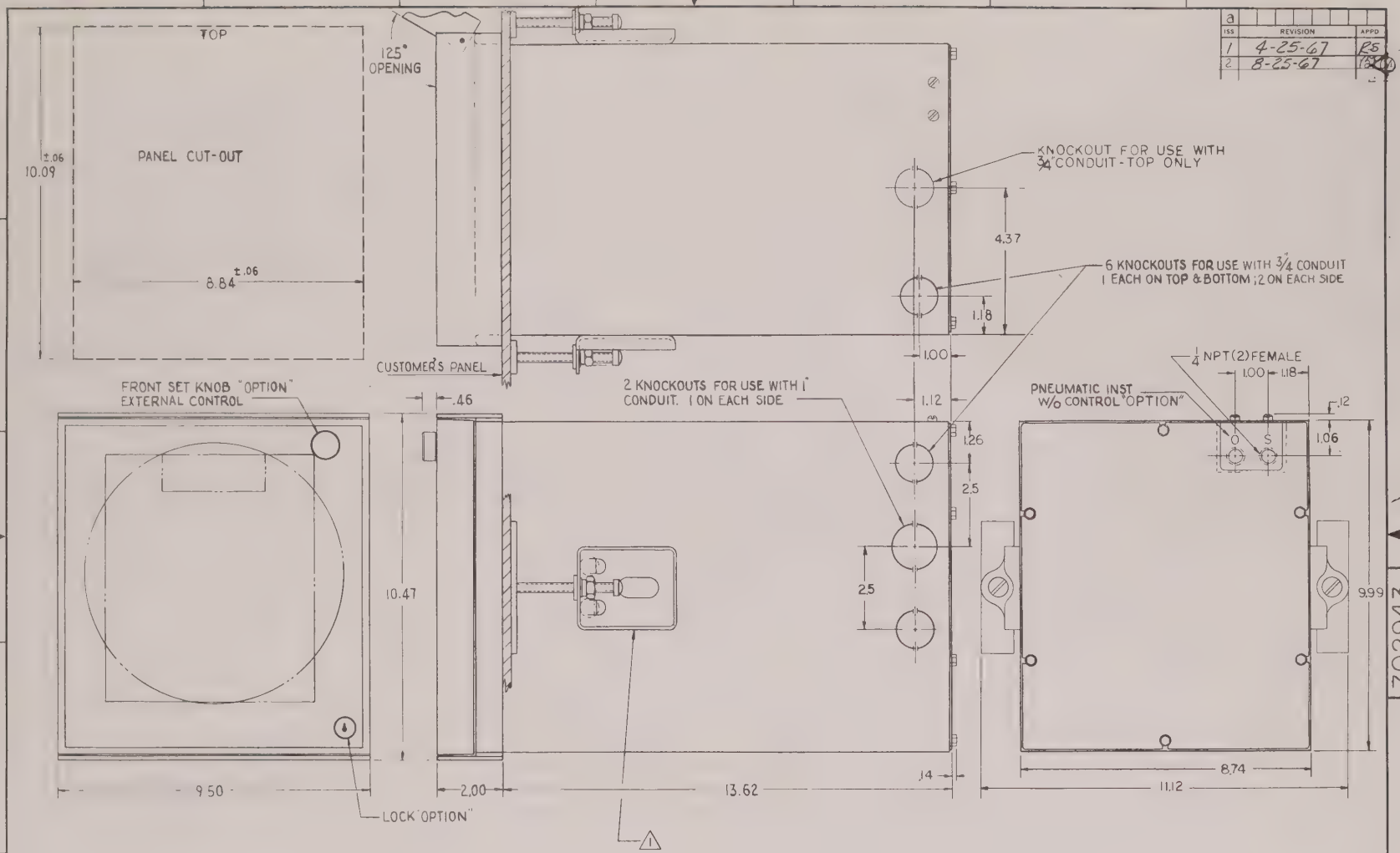
Model Specification Table VII Option No. Servo #1			Servo #2	Transmitting S/W Key #3	Resistance	Vari/Resistor Ass'y Key #10	Resistor No. Key #10-1
501	551	521	571	30677788-001	100 Ω	omit	omit
505	555	525	575	30677788-001	100 Ω	30677779-001	30677784-001
502	552	522	572	30677788-002	500 Ω	omit	omit
506	556	526	576	30677788-002	500 Ω	30677779-002	30677784-002
503	553	523	573	30677788-003	1000Ω	omit	omit
507	557	527	577	30677788-003	1000 Ω	30677779-003	30677784-003
504	554	524	574	30677788-004	5000 Ω	omit	omit
508	558	528	578	30677788-004	5000 Ω	30677779-004	30677784-004

TABLE 2 - SLIDEWIRE CABLE ASSEMBLY

Model Specification Table VII Option No.				(K) 30734822-001 Key No. 16
501	502	503	504	
551	552	553	554	1
505	506	507	508	
555	556	557	558	omit
521	522	523	524	
571	572	573	574	1
525	526	527	528	
575	576	577	578	1

TABLE 3 - AVAILABLE MARKER CHARACTERS

Character	A	B	C	D	E	F	H	J	L	M	N	P	R	S	T	U



a		
ISS	REVISION	APPD
1	4-25-67	RS
2	8-25-67	RS

3 - MIN. RECOM. DISTANCE BETWEEN WALLS AND SIDES OF INST. - 6 IN.
2 - MIN. RECOMMENDED CENTERLINE DISTANCE BETWEEN TWO INSTRUMENTS MOUTED SIDE BY SIDE - 11.3 IN.

⚠1 FOR PANEL MTG USE KIT 359383-000

NOTE

REPRO. LOC.
CANADA ✓
SCOTLAND
GERMANY
JAPAN
FRANCE
AUSTRALIA
BRAZIL

HONEYWELL INC
PHILADELPHIA DIVISION

MOUNTING DIMENSIONS
PANEL MOUNTED SMALL CASE
CLASS III INST

FIRST USED ON
REF.
MATERIAL
FINISH
DR. 3-66
CHK 8-29-67
ENGR 4/26
DSGN SUPVR
SIZE C
DRAWING NO. 702943
SCALE 1/2 SIZE
SHEET

702943

7766-HM-290

TB1 CUSTOMER TERMINAL PANEL ⑤

ITEM NO	INTERNAL FUNCTION	REF DIAGRAM ②
1 2 3 4	PV ABOVE SP; 10 20 30 40; ERROR GENERATOR	730331
B	REMOTE CHART SWITCH FOR SINGLE SPEED CHART DRIVE	703114 ⑥
A	EVENT PEN	730330 ⑤
5 9 13	C / NC / NO — FRONT SET SWITCH #3 OR BACK SET SWITCH #6	730326
6 7 8	C / NC / NO — FRONT SET SWITCH #4 OR BACK SET SWITCH #5	730326
10 11 12	C / NC / NO — FRONT SET SWITCH #2 OR BACK SET SWITCH #7	730326
14 15 16	NC / NO — FRONT SET SWITCH #1 OR BACK SET SWITCH #8	730326
E	#1 TRANSMITTING SLIDEWIRE WITHOUT TRIMPOTS; E C D	730332 ⑧
D C E F H	#1 TRANSMITTING SLIDEWIRE WITH TRIMPOTS; T/P #2, S/W, T/P #1, CW, CW; E F C H D	730332 ⑧
J K L	#2 TRANSMITTING SLIDEWIRE; L K J	730332 ⑧

SERVO PLATE

TRANSMITTING SLIDEWIRES

SERVO SHAFT

5 6 7 8 BACK SET SWITCHES

1 3

DIFFERENTIAL GEAR SHAFT

2 4 FRONT SET SWITCHES

CONTROL SWITCH LEGEND

INPUT CONNECTION VARIATIONS

THERMOCOUPLE — JUMPER

MILLIVOLT, RADIAMATIC OR TACHOMETER DC VOLTS OR DC CURRENT — SHIELD — JUMPER

RESISTANCE THERMOMETER — R1 — JUMPER

TB1 ⑨

1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
GRD NEUT HOT HOT SW ⑦

GROUND DIRECTLY AND SEPARATELY TO A SUITABLE EARTH GROUND

A. C. LINE — GROUND SIDE OF LINE — FUSED LINE SWITCH

REV	DESCRIPTION	BY
1	4-28-67	RS
2	REVISED 3-21-68	RS
3	REVISED 10-7-68	RK
4	REVISED 1-4-69	RS
5	REVISED 2-24-69	RS
6	REVISED 7-28-69	RS
7	REVISED 7-28-69	RS
8	REVISED 12-9-69	RS
9	REVISED 3-25-70	RS
10	REVD 12-17-70	RS

⑤ NUMBER SHOWN ABOVE TERMINAL ON TB1 MAYBE COVERED BY TAB WITH LETTER. SEE TABLE.

⑧ TERMINALS NOT SHOWN DUE TO VARYING LOCATION

⑦ 120 VAC POWER, MAX OF 25 WATTS, FUSED AND CONTROLLED BY INSTRUMENT POWER SWITCH AVAILABLE AT "HOT SW" TERMINAL FOR CUSTOMER USE

⑥ IF TABLE VII OPTION 152, REMOTE CHART SWITCH SINGLE SPEED IS SPECIFIED SEE OPTION TABLE BELOW

⑤ - OPTIONS USING SAME TERMINALS NOT AVAILABLE TOGETHER

④ - OPERATION OF FRONT AND/OR BACK SET SWITCHES

CIRCUIT CONN BETWEEN TERM	CIRCUIT ENERGIZED WHEN PV IS
C AND NO	BELOW SWITCH SETTING
C AND NC	ABOVE SWITCH SETTING

C - SWITCH COMMON
NC - SWITCH NORMALLY CLOSED CONTACT
NO - SWITCH NORMALLY OPEN CONTACT

③ - REF RE MAKING CONNECTIONS CHECK NAMEPLATE VOLTAGE RATINGS

② - REFERENCE DIAGRAMS IN TABLE ARE FOR INTERNAL WIRING ONLY

① - REFERENCE JUNCTION COMPENSATOR INSTALLED ON INSTRUMENTS WITH THERMOCOUPLE PRIMARY ELEMENTS ONLY

NOTES -

OPTIONS

EVENT PEN — A A — C — IF TABLE VII OPTION 300 120V 50-60HZ OR 24 VDC IF TABLE VII OPTION 301

⑥ REMOTE CHART SW — 120V 60HZ (FROM "HOT SW" OR "HOT" TERMINAL) — B

HONEYWELL INC. PHILADELPHIA 0 PA.

CUSTOMER TERMINAL CONN-ONE SERVO INSTRUMENT

CL-111 & 112

D 702949

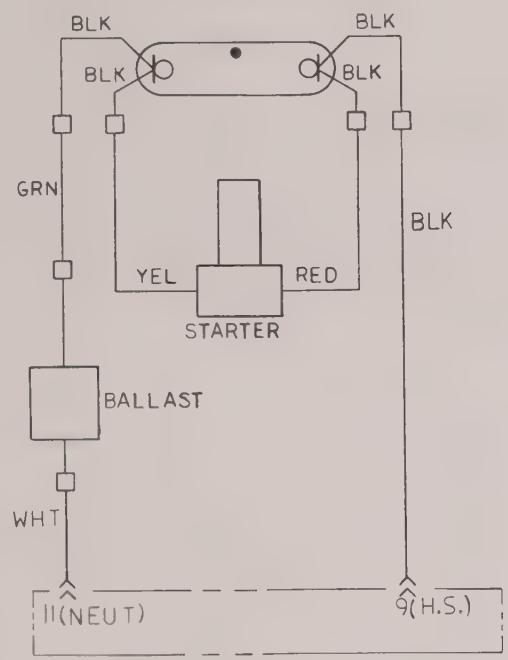
7776 HM 302

702949

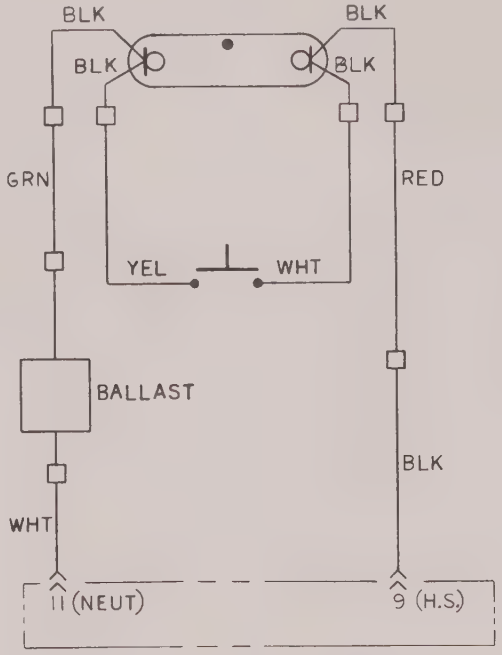
SHEET	2	3	4	5
REVISION				

PRE REL									
ISS	DESCRIPTION	APPD
2	REDRAWN 2-1-73	
3	REV'D 6-26-80	

SELF STARTING (CL-112)



MANUAL START (CL-111)



1 - □ SPLICE CONNECTION

NOTES

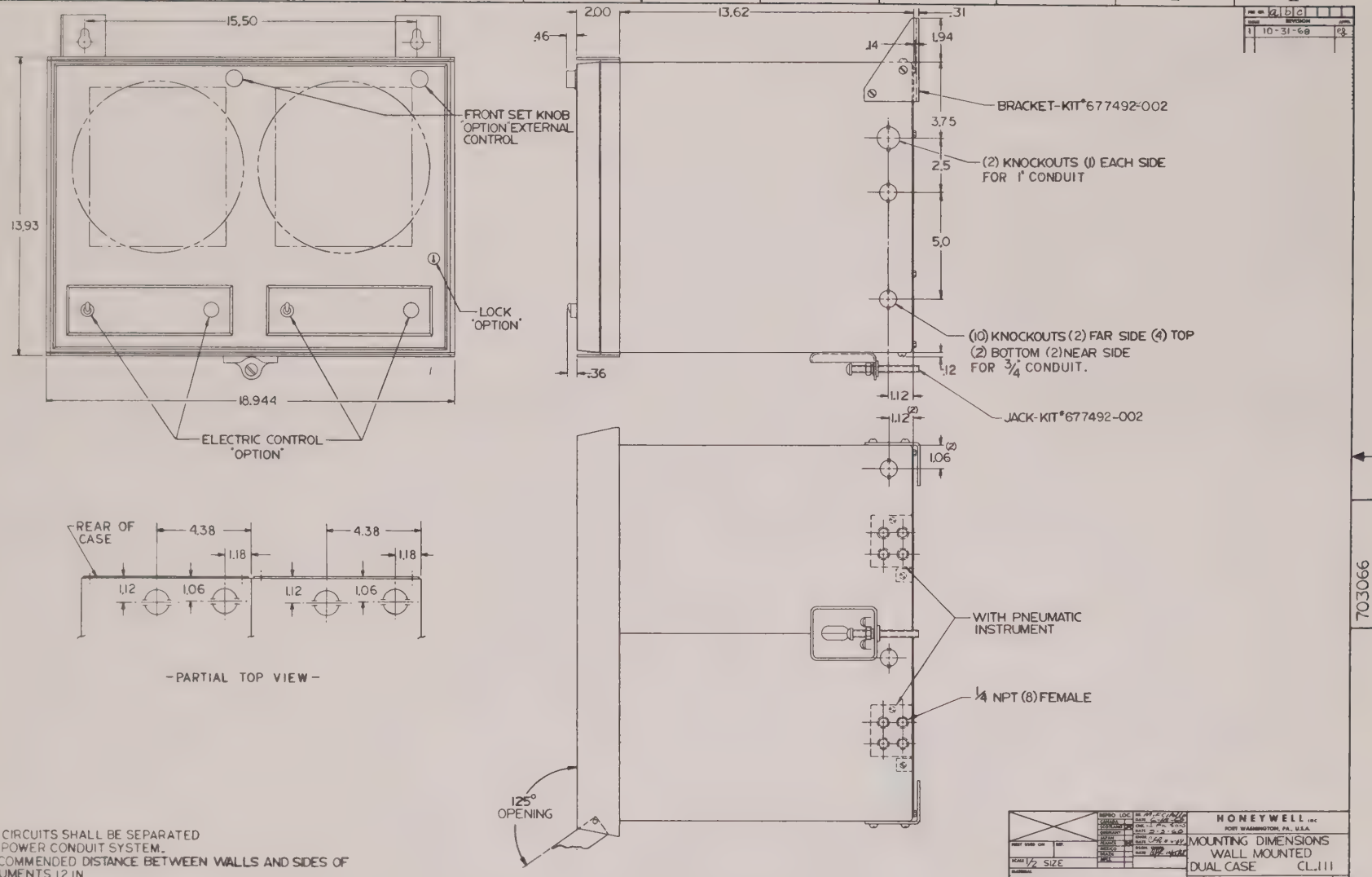
TOLERANCES		DR. EJS	2-1-73	Honeywell
.0 = ±	FORM ∠ = ±	CHK.		WIRING DIAGRAM
.00 = ±	OTHER ∠ = ±	ENGR.		FLUORESCENT ILLUMINATION
.000 = ±	FINISH √ =	P.E.		CL-111 & CL-112
MATERIAL		CANADA [X] JAPAN		B 30703065-000
FINISH		FRANCE SCOTLAND [X]		SCALE NONE USED ON SHEET 1 OF 1
		GERMANY		

B 30703065-000

SC BH FW

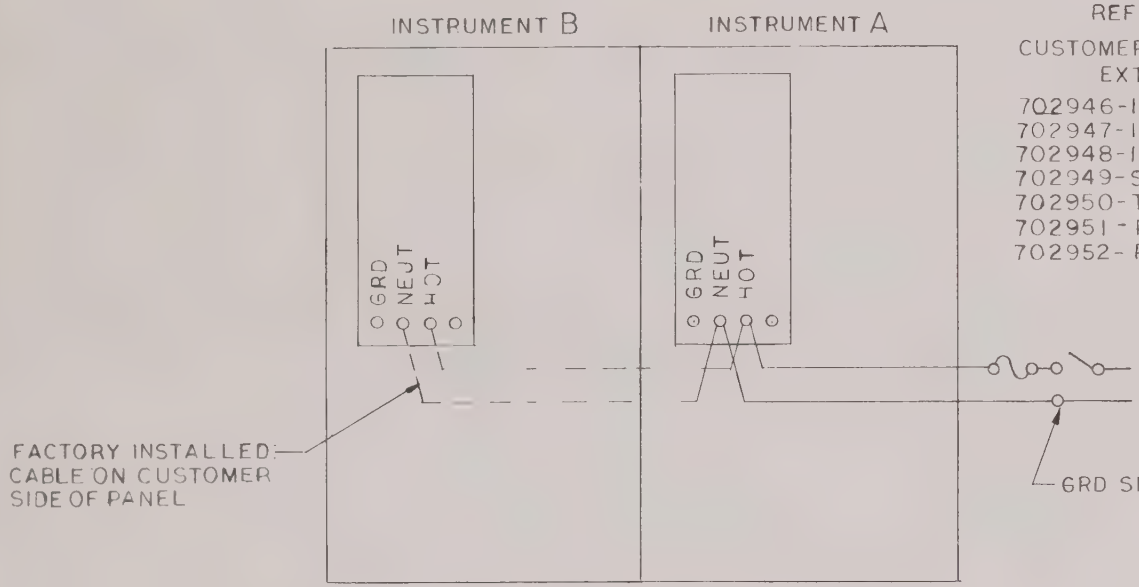
F 4503 18/71

PLATE


15.50
13.93
18.944
FRONT SET KNOB
"OPTION" EXTERNAL
CONTROL
LOCK
"OPTION"
ELECTRIC CONTROL
"OPTION"
2.00
13.62
.31
.46
.14
1.94
BRACKET-KIT*677492-002
3.75
2.5
(2) KNOCKOUTS (1) EACH SIDE
FOR 1" CONDUIT
5.0
(10) KNOCKOUTS (2) FAR SIDE (4) TOP
(2) BOTTOM (2) NEAR SIDE
FOR 3/4 CONDUIT.
.36
.12
1.12
JACK-KIT*677492-002
1.06
WITH PNEUMATIC
INSTRUMENT
1/4 NPT (8) FEMALE
125°
OPENING
REAR OF
CASE
4.38
4.38
1.18
1.18
1.12
1.06
1.12
1.06
-PARTIAL TOP VIEW-
2.- INPUT CIRCUITS SHALL BE SEPARATED
FROM POWER CONDUIT SYSTEM.
1.- MIN RECOMMENDED DISTANCE BETWEEN WALLS AND SIDES OF
INSTRUMENTS 12 IN.
NOTES:
1 10-31-68
HONEYWELL INC
PORT WASHINGTON, PA. U.S.A.
MOUNTING DIMENSIONS
WALL MOUNTED
DUAL CASE CL.III
SCALE 1/2 SIZE
D 703066
703066
PLATE 7969 AB'11

PRE REL								
ISSUE	REVISION							APPD.
1	10-28-'68							eb

703067



REFFRENCE DRAWINGS

CUSTOMER CONNECTIONS - EXTERNAL

702946-INTEGRAL E-O-V CONT.
702947-INTEGRAL E-O-P CONT.
702948-INTEGRAL E-O-L CONT.
702949-SINGLE SERVO
702950-TWO SERVO
702951-PNEUMATIC TRANS
702952-PNEUMATIC CONT.

REPRO. LOC.	DR. R. KRAUSE DATE 6-12-68
CANADA	
SCOTLAND X	CHK. L. FILSON DATE 9-3-68
GERMANY	ENGR. DATE 10-14-68
JAPAN	
FRANCE X	DSGN. SUPV. DATE
MEXICO	
BRAZIL	
MPLS.	WTM 10-11-68

SCALE NONE

HONEYWELL INC.
FORT WASHINGTON, PA., U.S.A.

CUSTOMERS TERM. CONNECTION DUAL CASE CL.III

MATERIAL

FINISH

FIRST USED ON 70.3 Rev

REF.

B SIZE

DRAWING NO. 703067

SHEET 1 OF 1

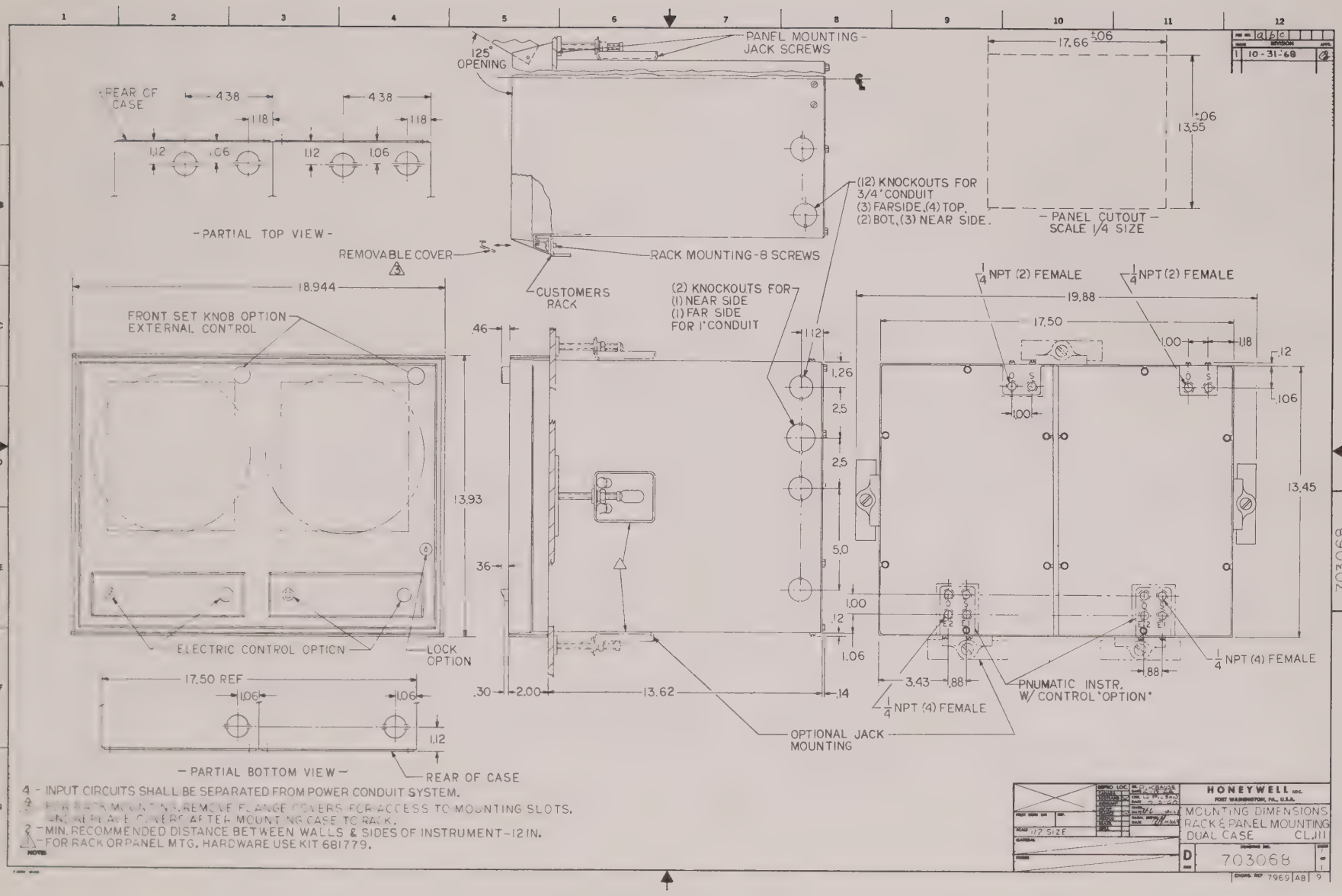
ENGRG. REF. 7969 AB 8

PLATE

NOTES:

1.-INPUT CIRCUITS SHALL BE SEPARATED FROM POWER SUPPLY CONDUIT SYSTEM.

F-3548 (8-66)



4 - INPUT CIRCUITS SHALL BE SEPARATED FROM POWER CONDUIT SYSTEM.

2 - FOR PANEL MOUNTING, REMOVE FLANGE COVERS FOR ACCESS TO MOUNTING SLOTS. REINSTALL COVERS AFTER MOUNTING CASE TO RACK.

3 - MIN. RECOMMENDED DISTANCE BETWEEN WALLS & SIDES OF INSTRUMENT - 12 IN.

- FOR RACK OR PANEL MTG. HARDWARE USE KIT 681779.

NOTES

REVISION	APPD.
1 10-31-68	

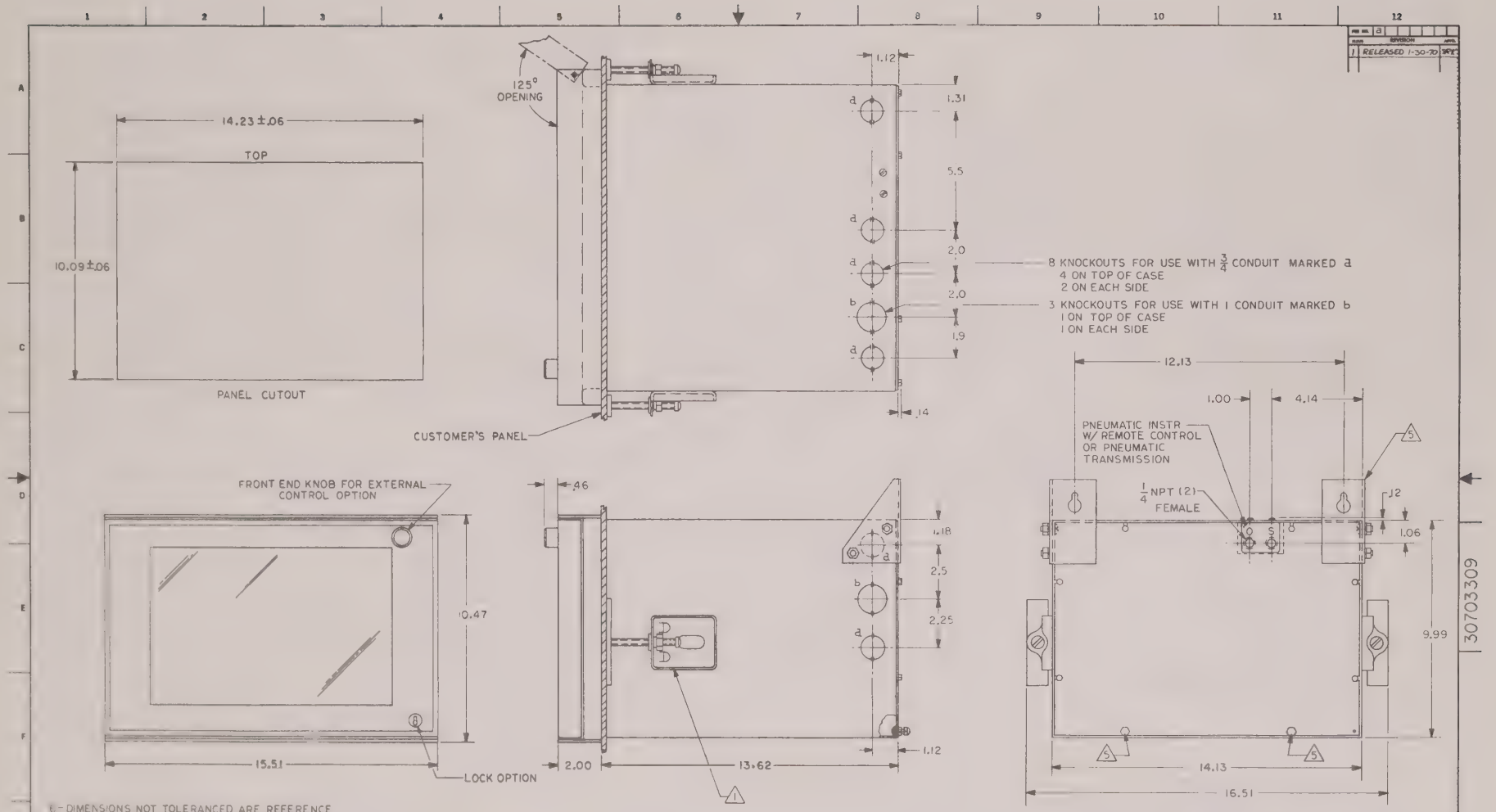
HONEYWELL INC. FORT WASHINGTON, PA., U.S.A.

MOUNTING DIMENSIONS RACK & PANEL MOUNTING DUAL CASE CL.III

D 703068

ENGRG. REC 7969 AB 9

703068



NOTES:
1. DIMENSIONS NOT TOLERANCED ARE REFERENCE
2. FOR WALL MOUNTING USE KIT 30677492-001
4. INPUT CIRCUITS SHALL BE SEPARATED FROM POWER CONDUIT SYSTEM.
3. MINIMUM RECOMMENDED DISTANCE BETWEEN WALLS AND SIDES OF INSTRUMENTS = 12 INCHES
2. MINIMUM RECOMMENDED CENTERLINE DISTANCE BETWEEN TWO INSTRUMENTS MOUNTED SIDE BY SIDE = 17.8 INCHES
1. FOR PANEL MOUNTING USE KIT 30359383-000

SIZE	30703309
SCALE	1/2 SIZE

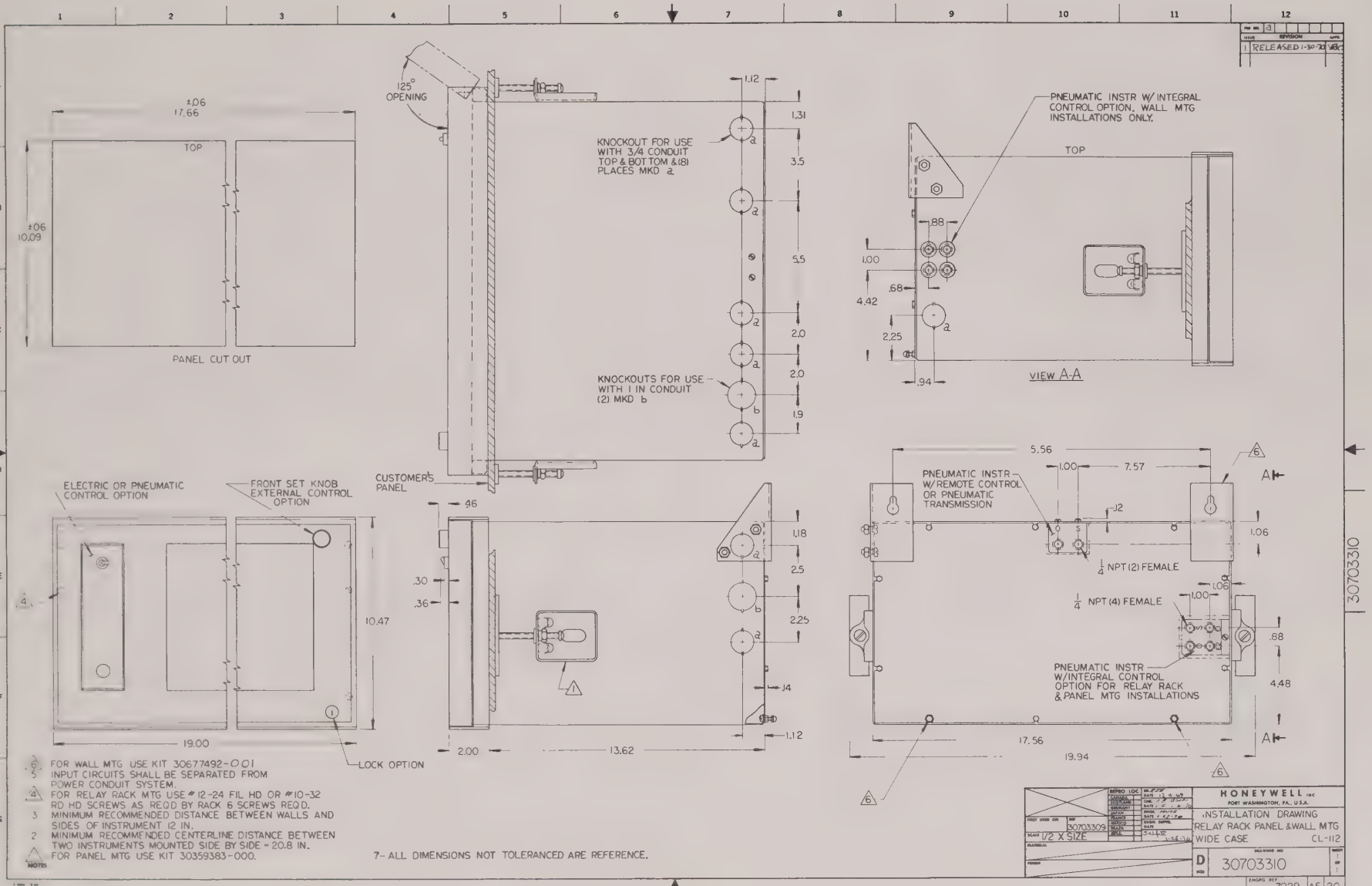
HONEYWELL INC.
PORT WASHINGTON, PA., U.S.A.

INSTALLATION DRAWING
PANEL & WALL MOUNTED
CL-112

D 30703309

30703309

7029 AF 19



6 FOR WALL MTG USE KIT 30677492-001

5 INPUT CIRCUITS SHALL BE SEPARATED FROM POWER CONDUIT SYSTEM.

4 FOR RELAY RACK MTG USE #12-24 FIL HD OR #10-32 RD HD SCREWS AS REQD BY RACK 6 SCREWS REQD.

3 MINIMUM RECOMMENDED DISTANCE BETWEEN WALLS AND SIDES OF INSTRUMENT 12 IN.

2 MINIMUM RECOMMENDED CENTERLINE DISTANCE BETWEEN TWO INSTRUMENTS MOUNTED SIDE BY SIDE = 20.8 IN. FOR PANEL MTG USE KIT 30359383-000.

NOTES

7- ALL DIMENSIONS NOT TOLERANCED ARE REFERENCE.

REVISION	APPD
1 RELEASED 1-30-73	

HONEYWELL INC
PORT WASHINGTON, PA., U.S.A.

INSTALLATION DRAWING
RELAY RACK PANEL & WALL MTG
WIDE CASE CL-112

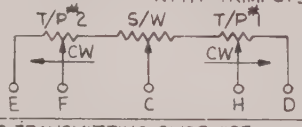
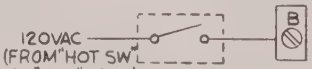
SCALE 1/2 X SIZE

D 30703310

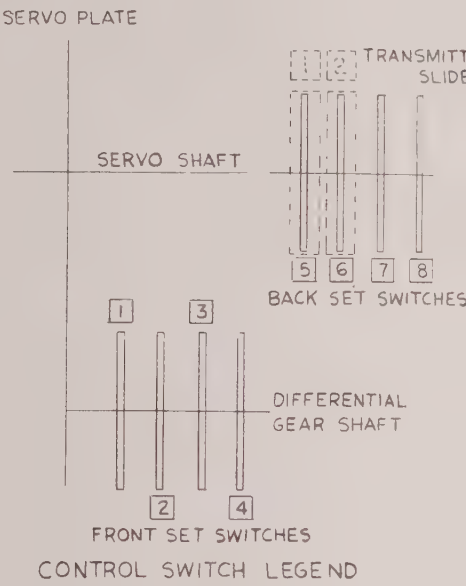
ENGRG REC 7029 AF 20

30703310

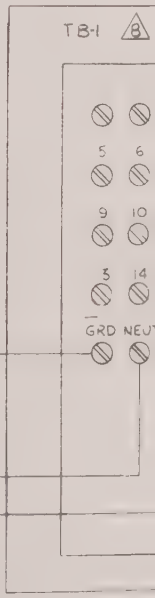
TB1 CUSTOMER TERMINAL PANEL ⚠5

TERM NO	INTERNAL FUNCTION	REFERENCE DIAGRAM ⚠2
5 C 9 NC 13 NO	FRONT SET SWITCH #3 OR BACK SET SWITCH #6	30750404
6 C 7 NC 8 NO	FRONT SET SWITCH #4 OR BACK SET SWITCH #5	30750404
10 C 11 NC 12 NO	FRONT SET SWITCH #2 OR BACK SET SWITCH #7	30750404
14 C 15 NC 16 NO	FRONT SET SWITCH #1 OR BACK SET SWITCH #8	30750404
C D E	#1 TRANSMITTING SLIDEWIRE WITHOUT TRIMPOTS	30750401
D C E F H	#1 TRANSMITTING SLIDEWIRE WITH TRIMPOTS 	30750401
J K L	#2 TRANSMITTING SLIDEWIRE	30750401
B	REMOTE CHART SWITCH 	30750415

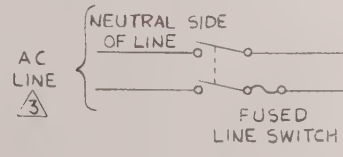
⚠4 ⚠7



CONTROL SWITCH LEGEND



GROUND DIRECTLY AND SEPARATELY TO A SUITABLE EARTH GROUND



⚠10 - FOR DUAL RANGE OR SELECT-O-RANGE D.C. CURRENT ACTUATION, SHUNT RESISTORS IN INCLUDED KIT MUST BE PLACED ACROSS THOSE TERMINALS TO BE USED WITH D.C. CURRENT ACTUATION.

⚠9 - INDIVIDUAL SHUNT RESISTORS FOR DC CURRENT INPUT PREMOUNTED ON TB3.

⚠8 - NUMBER SHOWN ABOVE TERMINAL ON TB1 MAYBE COVERED BY TAB WITH LETTER, SEE TABLE

⚠7 - TERMINALS NOT SHOWN DUE TO VARYING LOCATION

⚠6 - 120 VAC POWER, MAX OF 20 WATTS, FUSED AND CONTROLLED BY INSTRUMENT POWER SWITCH AVAILABLE AT "HOT SW" TERMINAL FOR CUSTOMER USE

⚠5 - OPTIONS USING SAME TERMINALS NOT AVAILABLE TOGETHER

⚠4 - OPERATION OF FRONT AND/OR BACK SET SWITCHES

CIRCUIT CONN BETWEEN TERM	CIRCUIT ENERGIZED WHEN PV IS
C AND NO	BELOW SWITCH SETTING
C AND NC	ABOVE SWITCH SETTING

C - SWITCH COMMON
NC - SWITCH NORMALLY CLOSED CONTACT
NO - SWITCH NORMALLY OPEN CONTACT

⚠3 - BEFORE MAKING CONNECTIONS CHECK NAMEPLATE VOLTAGE RATINGS

⚠2 - REFERENCE DIAGRAMS IN TABLE ARE FOR INTERNAL WIRING ONLY

⚠1 - REFERENCE JUNCTION COMPENSATION RESISTOR IS INCLUDED IN ALL INSTRUMENTS WITH THERMOCOUPLE, RADIAMAT MILLIVOLT ACTUATION. MEASURING CIRCUIT DETERMINES WHETHER OR NOT IT IS IN CIRCUIT.

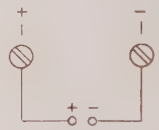
NOTES

SHEET	2	3	4	5
REVISION				

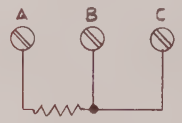
PRE REL	2	1
NO.	DESCRIPTION	APPD
2	RELEASED 1-5-71	
3	REV'D 1-22-81	

TB-3 TERMINAL BLOCK INPUT CONNECTION VARIATIONS

THERMOCOUPLE, MILLIVOLTS, RADIAMATIC, DC VOLTS AND ALL DUAL RANGE OR SELECT-O-RANGE ACTUATORS	RESISTANCE THERMOMETER
±1 THRU ±12 ±1 THRU ± 6 ±1 THRU ± 4 ±1 THRU ± 3 ±1 AND ± 2	2,3,4,6 OR 12 INPUTS ONLY



TYPICAL CONNECTION

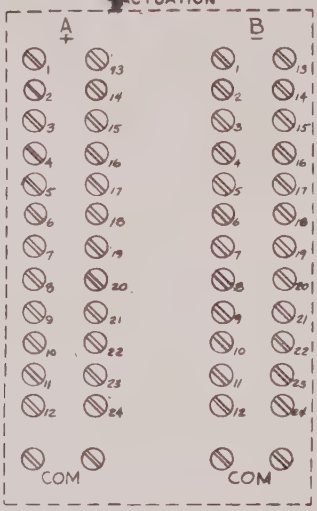


TYPICAL CONNECTION

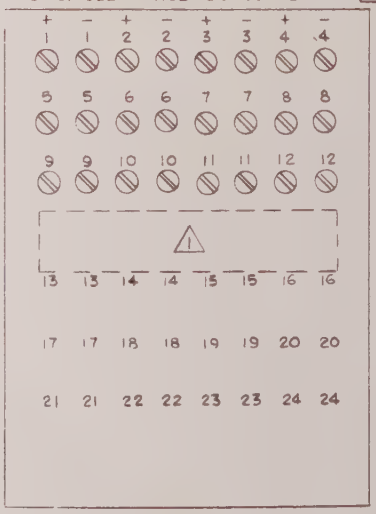
DC CURRENT (9)
2,3,4,6 OR 12 INPUTS ONLY

TYPICAL CONNECTION

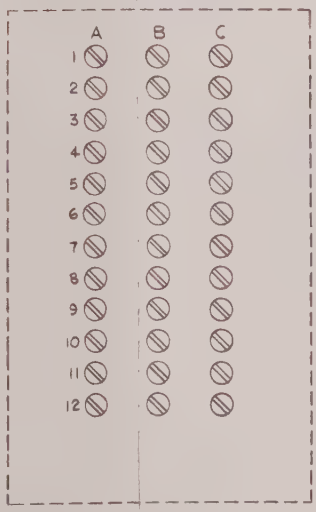
24 POINT MV ACTUATION



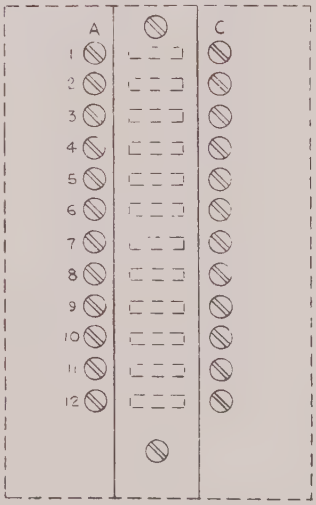
TB-3 ALL CONNECTIONS EXCEPT RTB AND SINGLE RANGE DC CURRENT (10)



ALTERNATE TB3 CONFIGURATION FOR RESISTANCE THERMOMETER ACTUATION



(9)
ALTERNATE TB3 CONFIGURATION FOR SINGLE RANGE DC CURRENT ACTUATION



D 30703533-000

B

SC
BH
FW
A

FIND NO.	IDENTIFYING NO.	DESCRIPTION
	PARTS LIST	

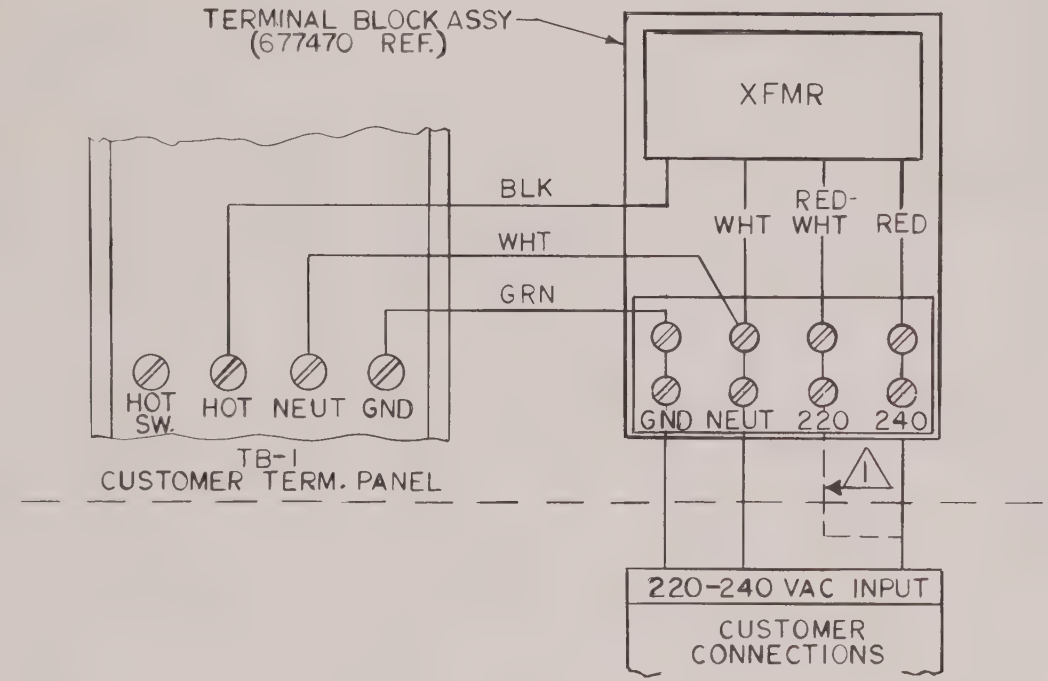
QTY. REQ'D.		
DRAWN JI	9-22-71	HONEYWELL INC FORT WASHINGTON, PA., U.S.A.
CHECKED R.S. f.c.	10-28-71	CUSTOMER TERMINAL CONN.
ENGR. G. Gregory	9-28-71	
P.E.		MECH MPT CL III/112
REF 30703224		
CANADA X JAPAN		D SIZE 30703533-000
FRANCE SCOTLAND X		SCALE USED ON SHEET OF
GERMANY		

TOLERANCES
.0 = FORM ∠ =
.00 = OTHER ∠ =
.000 = FINISH √ =

MATERIAL

FINISH

D: LTF 7148 AA 105



1 — CONNECT PER DASH LINE FOR 220VAC OPERATION.

NOTE:

SHEET	2	3	4	5
REVISION				

PRE REL	a	1						
ISS	DESCRIPTION							APPD
1	RELEASED 12-22-72							R.S.

B 30703745-000

TOLERANCES
.0 = ±
.00 = ±
.000 = ±
FORM ∠ = ±
OTHER ∠ = ±
FINISH √ =

MATERIAL

FINISH

DR. Sundby 11/15/72
CHK. Sundby T/C 11/16/72
ENGR. ECK 11/16/72
P.E.

CANADA ☒ JAPAN ☒
FRANCE SCOTLAND ☒
GERMANY

Honeywell

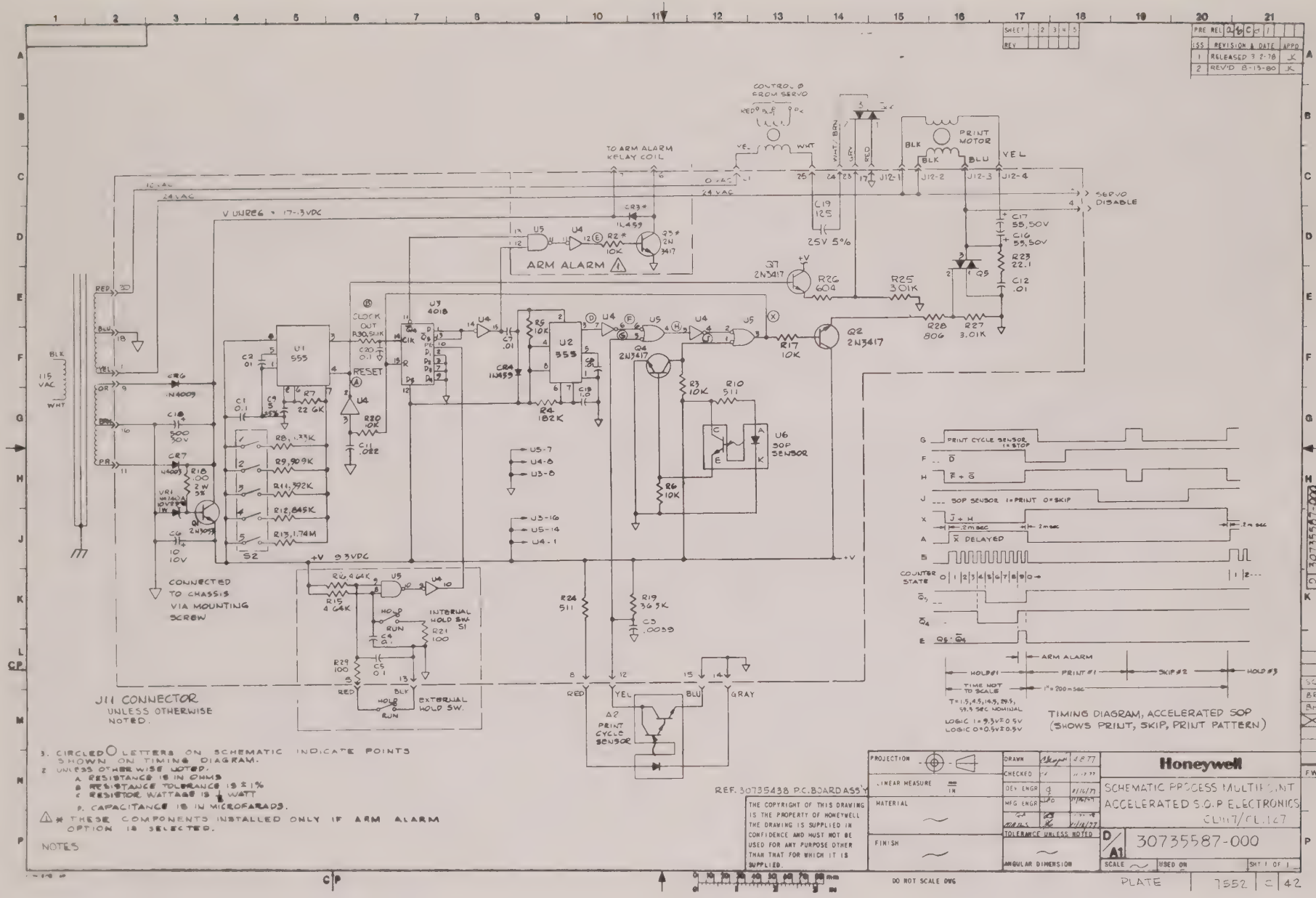
WIRING DIAGRAM
220-240VAC XFMR
CL111-112

B SIZE 30703745-000

SCALE NONE USED ON 6024 SHEET 1 OF 1

72 202

PLATE



3. CIRCLED Ⓞ LETTERS ON SCHEMATIC INDICATE POINTS SHOWN ON TIMING DIAGRAM.
2. UNLESS OTHERWISE NOTED:
   A. RESISTANCE IS IN OHMS
   B. RESISTANCE TOLERANCE IS ±1%
   C. RESISTOR WATTAGE IS ¼ WATT
   D. CAPACITANCE IS IN MICROFARADS.

⚠ * THESE COMPONENTS INSTALLED ONLY IF ARM ALARM OPTION IS SELECTED.

NOTES

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REV	ISS	REVISION & DATE	APPD
	1	RELEASED 3-2-78	JK
	2	REVID 8-13-80	JK

PROJECTION
LINEAR MEASURE IN
MATERIAL
FINISH
TOLERANCE UNLESS NOTED
ANGULAR DIMENSION
DO NOT SCALE DWG

DRAWN 2-8-77
CHECKED
DES ENGR 9/16/77
MFG ENGR
MARKS 9/16/77

Honeywell

SCHEMATIC PROCESS MULTIPOINT
ACCELERATED S.O.P ELECTRONICS
CL117/FL127

D/A1 30735587-000

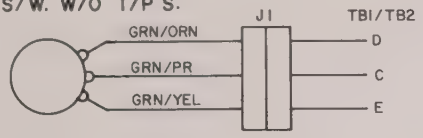
SCALE — USED ON — SHT 1 OF 1

PLATE 7552 C 42

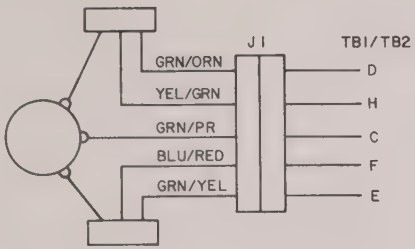
SHT	1	2	3	4	5
REV					

PRE REL														
ISS	REVISION & DATE													APPD
1	RELEASED 10-11-78													JK

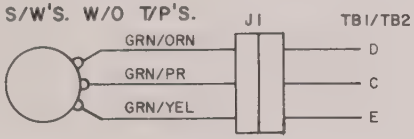
1 S/W. W/O T/P'S.

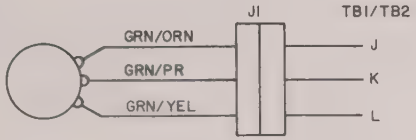


1 S/W. W T/P.

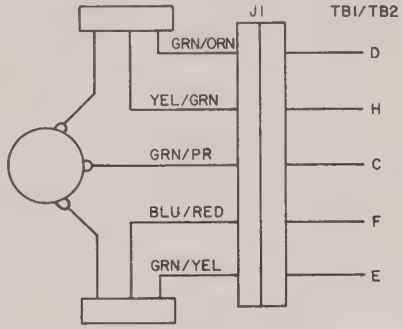


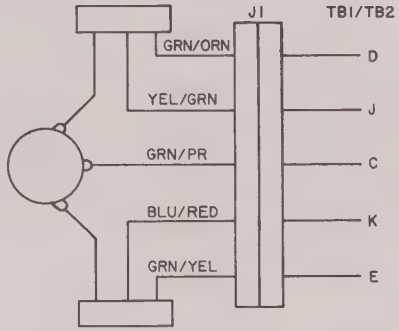
2 S/W'S. W/O T/P'S.



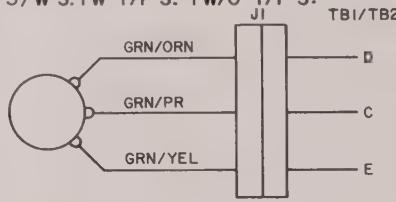


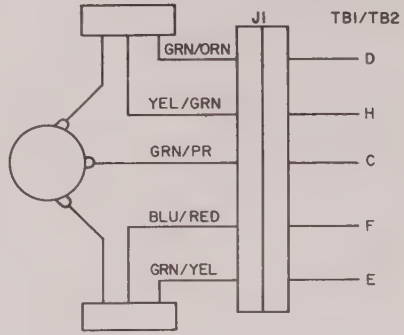
2 S/W'S. W T/P'S.





2 S/W'S. 1W T/P'S. 1W/O T/P'S.





⚠1 TERMINALS TO BE INSERTED IN ANY AVAILABLE POSITION. TERMINAL NUMBERS ON J1 & TB1 TO CORRESPOND. EXAMPLE J1-15, 16 AND TB1-15, 16.

NOTES:

C 30750401-000

SC
BR
BH
FW

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PROJECTION	DRAWN	JN 6/9/78
LINEAR MEASURE: mm / IN	CHECKED	6-78
MATERIAL	DEV ENGR	ECK 6-78
	MFG ENGR	D.J. 6/78
FINISH	REF. 30730333	
	TOLERANCE UNLESS NOTED	
	ANGULAR DIMENSIONS	

Honeywell

WIRING DIAGRAM
NO 1 & 2 SERVOS
TRANSMITTING S/W CL III 8112

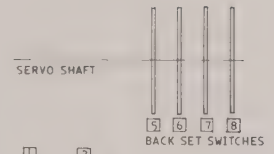
C/A2 30750401-000

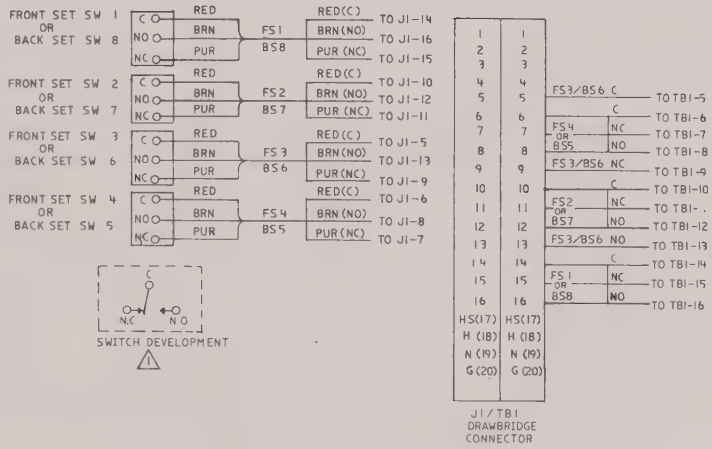
SCALE NONE | USED ON | SHT 1 of 1

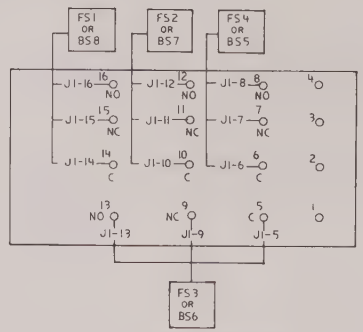
DO NOT SCALE DWG

PLATE | 7613 | BE

F-2703 (10/75) OAI







TB1 CUSTOMER TERMINAL PANEL

⚠1 OPERATION OF FRONT AND/OR BACK SET SWITCHES

CIRCUIT CONN BETWEEN TERM	CIRCUIT ENERGIZED WHEN PV IS
C AND N.O.	BELOW SWITCH SETTING
C AND N.C.	ABOVE SWITCH SETTING

C – SWITCH COMMON
N.C. – SWITCH NORMALLY CLOSED CONTACT
N.O. – SWITCH NORMALLY OPENED CONTACT

NOTES

REF. 30750326

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PROJECT:ON	DRAWN	JK 6-12-78
LINEAR MEASURE: mm IN	CHECKED	CPA 6-21-78
	DEV ENGR	ECK 6-28-78
MATERIAL	MFG ENGR	D.J. 6/78
FINISH	TOLERANCE UNLESS NOTED	
	ANGULAR DIMENSION	

Honeywell

WIRING DIAGRAM
CONTACT CONTROL
ONE SERVO INSTRUMENT
CL-111 & 112

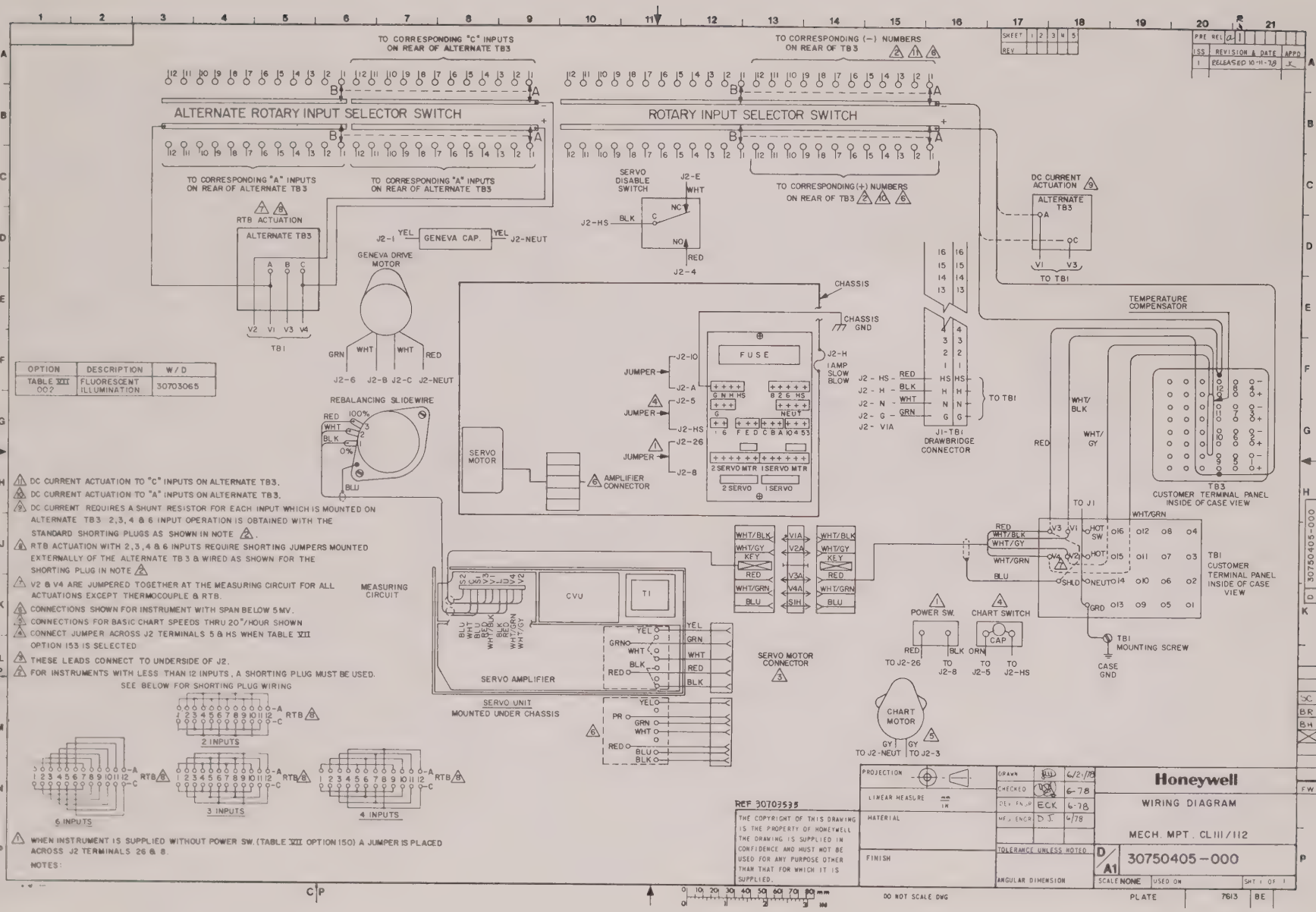
D/A1 30750404-000

SCALE NONE | USED ON | SHT 1 OF 1

DO NOT SCALE DWG

PLATE 7613 BE

D 30750404-000


ALTERNATE ROTARY INPUT SELECTOR SWITCH
ROTARY INPUT SELECTOR SWITCH
TO CORRESPONDING "C" INPUTS ON REAR OF ALTERNATE TB3
TO CORRESPONDING (−) NUMBERS ON REAR OF TB3
TO CORRESPONDING "A" INPUTS ON REAR OF ALTERNATE TB3
TO CORRESPONDING "A" INPUTS ON REAR OF ALTERNATE TB3
TO CORRESPONDING (+) NUMBERS ON REAR OF TB3
RTB ACTUATION
ALTERNATE TB3
TB1
V2 V1 V3 V4
SERVO DISABLE SWITCH
J2-E
WHT
J2-HS
BLK
NC
NO
RED
J2-4
J2-1 YEL
GENEVA CAP.
YEL J2-NEUT
GENEVA DRIVE MOTOR
GRN WHT WHT RED
J2-6 J2-B J2-C J2-NEUT
REBALANCING SLIDEWIRE
RED 100%
WHT 3
BLK 2
1
0%
BLU
CHASSIS
CHASSIS GND
FUSE
J2-H
1 AMP SLOW BLOW
JUMPER J2-10
J2-A
JUMPER J2-5
J2-HS
JUMPER J2-26
J2-8
2 SERVO MTR 1 SERVO MTR
2 SERVO 1 SERVO
SERVO MOTOR
AMPLIFIER CONNECTOR
J2 - HS - RED
J2 - H - BLK
J2 - N - WHT
J2 - G - GRN
J2 - V1A
TO TB1
J1-TB1 DRAWBRIDGE CONNECTOR
DC CURRENT ACTUATION
ALTERNATE TB3
OA
OC
V1 V3
TO TB1
TEMPERATURE COMPENSATOR
WHT/BLK
WHT/GY
RED
TO J1
WHT/GRN
TB3
CUSTOMER TERMINAL PANEL INSIDE OF CASE VIEW
RED
WHT/BLK
WHT/GY
WHT/GRN
BLU
V3 V1 V4 V2
HOT SW
HOT
NEUT
SHLD
GRD
TB1
CUSTOMER TERMINAL PANEL INSIDE OF CASE VIEW
TB1 MOUNTING SCREW
CASE GND
POWER SW.
CHART SWITCH
CAP
RED
BLK ORN
TO J2-26
TO J2-8
TO J2-5
TO J2-HS
CHART MOTOR
GY
GY
TO J2-NEUT
TO J2-3
WHT/BLK
WHT/GY
KEY
RED
WHT/GRN
BLU
V1A V2A V3A V4A SIH
SERVO MOTOR CONNECTOR
CVU
TI
SERVO AMPLIFIER
SERVO UNIT MOUNTED UNDER CHASSIS
YEL
GRN
WHT
BLK
RED
PR
BLU
2 INPUTS
3 INPUTS
4 INPUTS
6 INPUTS
RTB
OPTION
DESCRIPTION
W/D
TABLE XII 002
FLUORESCENT ILLUMINATION
30703065
1 DC CURRENT ACTUATION TO "C" INPUTS ON ALTERNATE TB3.
2 DC CURRENT ACTUATION TO "A" INPUTS ON ALTERNATE TB3.
3 DC CURRENT REQUIRES A SHUNT RESISTOR FOR EACH INPUT WHICH IS MOUNTED ON ALTERNATE TB3 2,3,4 & 6 INPUT OPERATION IS OBTAINED WITH THE STANDARD SHORTING PLUGS AS SHOWN IN NOTE 1.
4 RTB ACTUATION WITH 2,3,4 & 6 INPUTS REQUIRE SHORTING JUMPERS MOUNTED EXTERNALLY OF THE ALTERNATE TB 3 & WIRED AS SHOWN FOR THE SHORTING PLUG IN NOTE 2.
5 V2 & V4 ARE JUMPERED TOGETHER AT THE MEASURING CIRCUIT FOR ALL ACTUATIONS EXCEPT THERMOCOUPLE & RTB.
6 CONNECTIONS SHOWN FOR INSTRUMENT WITH SPAN BELOW 5 MV.
7 CONNECTIONS FOR BASIC CHART SPEEDS THRU 20"/HOUR SHOWN
8 CONNECT JUMPER ACROSS J2 TERMINALS 5 & HS WHEN TABLE VII OPTION 153 IS SELECTED
9 THESE LEADS CONNECT TO UNDERSIDE OF J2.
10 FOR INSTRUMENTS WITH LESS THAN 12 INPUTS, A SHORTING PLUG MUST BE USED. SEE BELOW FOR SHORTING PLUG WIRING
11 WHEN INSTRUMENT IS SUPPLIED WITHOUT POWER SW. (TABLE XII OPTION 150) A JUMPER IS PLACED ACROSS J2 TERMINALS 26 & 8.
NOTES:
MEASURING CIRCUIT
REF 30703535
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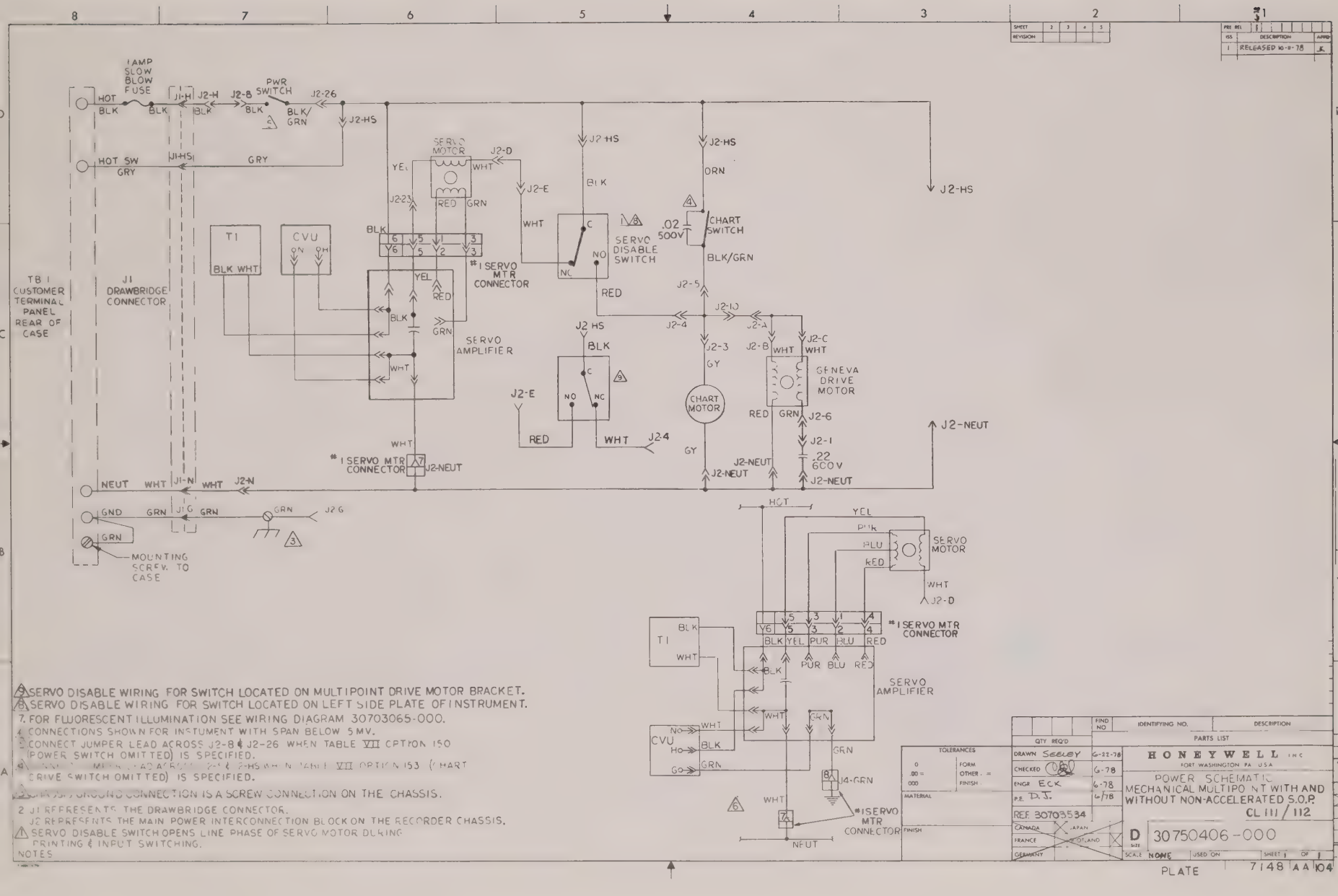
PROJECTION
LINEAR MEASURE
MATERIAL
FINISH
DRAWN
CHECKED
ENGR
MFG ENGR
TOLERANCE UNLESS NOTED
ANGULAR DIMENSION
DO NOT SCALE DWG
Honeywell
WIRING DIAGRAM
MECH. MPT. CL III/112
D A1 30750405-000
SCALE NONE
SHT 1 OF 1
PLATE 7613 BE
REVISION & DATE
RELEASED 10-11-78



⚠2 SERVO DISABLE WIRING FOR SWITCH LOCATED ON MULTIPOINT DRIVE MOTOR BRACKET.
⚠3 SERVO DISABLE WIRING FOR SWITCH LOCATED ON LEFT SIDE PLATE OF INSTRUMENT.
7. FOR FLUORESCENT ILLUMINATION SEE WIRING DIAGRAM 30703065-000.
4. CONNECTIONS SHOWN FOR INSTUMENT WITH SPAN BELOW 5 MV.
5. CONNECT JUMPER LEAD ACROSS J2-8 & J2-26 WHEN TABLE VII OPTION 150 (POWER SWITCH OMITTED) IS SPECIFIED.
6. [illegible] WHEN TABLE VII OPTION 153 (CHART DRIVE SWITCH OMITTED) IS SPECIFIED.
⚠1 GROUND CONNECTION IS A SCREW CONNECTION ON THE CHASSIS.
2 J1 REPRESENTS THE DRAWBRIDGE CONNECTOR.
J2 REPRESENTS THE MAIN POWER INTERCONNECTION BLOCK ON THE RECORDER CHASSIS.
⚠4 SERVO DISABLE SWITCH OPENS LINE PHASE OF SERVO MOTOR DURING PRINTING & INPUT SWITCHING.
NOTES

SHEET	2	3	4	5
REVISION				

PRE REL				
ISS	DESCRIPTION			APPD
1	RELEASED 10-8-78			JK

FIND NO	IDENTIFYING NO.	DESCRIPTION
QTY REQ'D	PARTS LIST	

DRAWN Seeley 6-22-78
CHECKED 6-78
ENGR E.C.K. 6-78
P.E. D.J. 6/78
REF 30703534
CANADA JAPAN FRANCE HOLLAND GERMANY

TOLERANCES: 0 .00 = .000 FORM OTHER = FINISH
MATERIAL
FINISH

HONEYWELL INC
FORT WASHINGTON PA U.S.A.

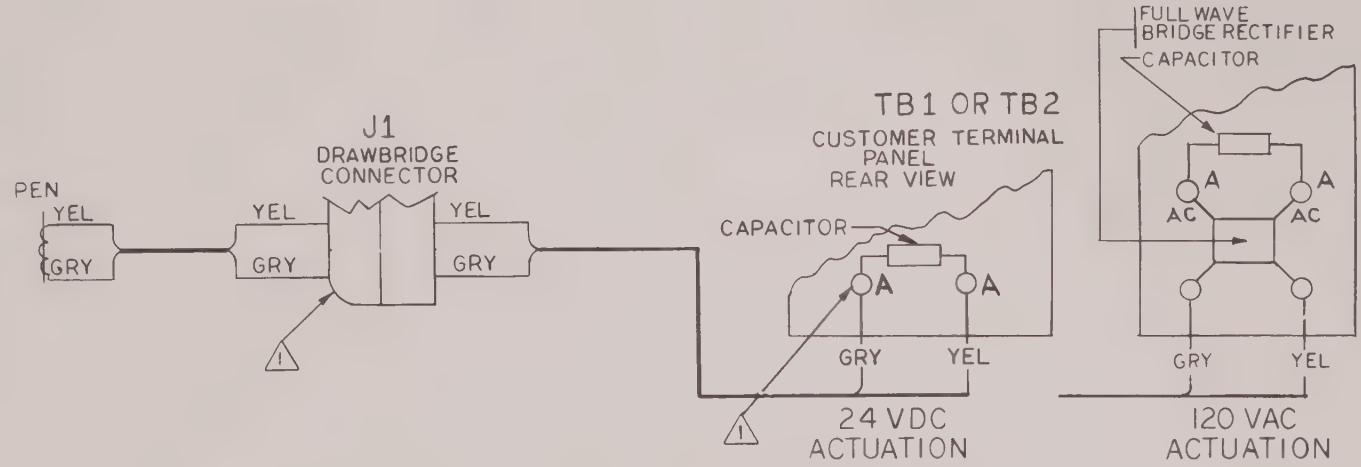
POWER SCHEMATIC
MECHANICAL MULTIPOINT WITH AND WITHOUT NON-ACCELERATED S.O.P.
CL 111 / 112

D 30750406-000
SIZE
SCALE NONE USED ON SHEET 1 OF 1

PLATE 7148 AA 104

PRE REL	1							
ISSUE	REVISION							APPD.
1	RELEASED 10-11-78							JK

30750411-000



SC
BR
BH

FW

⚠1 TERMINALS TO BE INSERTED IN ANY AVAILABLE POSITION. TERMINAL NUMBERS ON J1 & TB1 TO CORRESPOND E.G. J1-15, 16 AND TB1-15, 16.

NOTES

REPRO. LOC.	DR. DATE	CHK. DATE	ENGR DATE	DSGN. SUPVR DATE	REF.
CANADA	6/20/78				
SCOTLAND		6/78			
GERMANY			ECK 6/78		
JAPAN				D.J. 6/78	
FRANCE					
MEXICO					
BRAZIL					
MISC.					30730330

SCALE NONE

HONEYWELL INC.
FORT WASHINGTON, PA., U.S.A.

EVENT PEN
WIRING DIAGRAM
CLASS 111&112

MATERIAL	FIRST USED ON
FINISH	REF.

B SIZE

DRAWING NO. 30750411-000

SHEET 1 OF 1

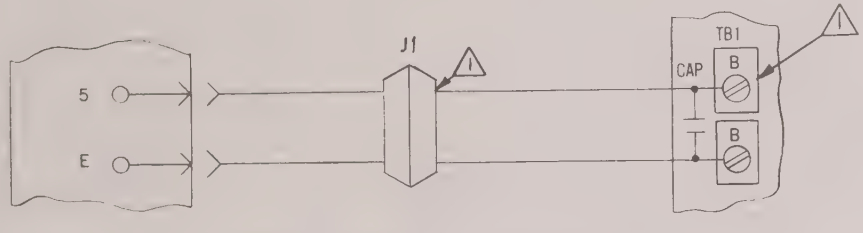
F-3548 (8-66)

PLATE 7613 BE

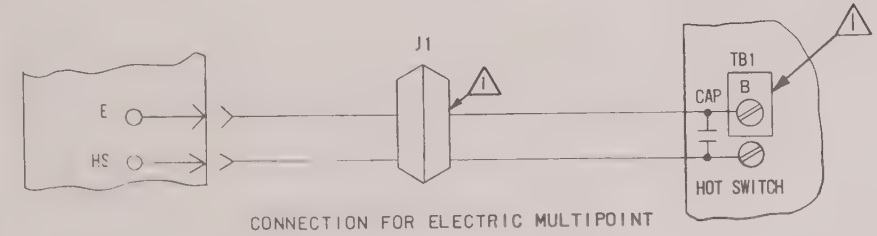
203-1 2278

SHEET	2	3	4	5
REVISION				

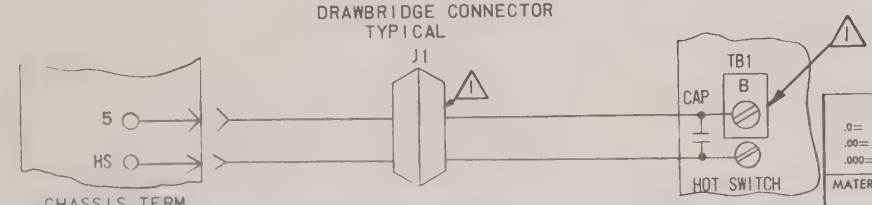
PRE REL										
ISS	DESCRIPTION									APPD
1	RELEASED 10-11-78									JK



CONNECTION FOR ELECTRIC MULTIPOINT
WITH OPTION 103 (OFF-NORMAL PRINTING)



CONNECTION FOR ELECTRIC MULTIPOINT



CHASSIS TERM.
BLOCK J2
TYPICAL

CONNECTIONS FOR ALL CL 111
& 112 INST. EXCEPT ELECTRIC
MULTIPOINT

CUST. TERM.
PANEL
TYPICAL

1 TERMINALS TO BE INSERTED IN ANY AVAILABLE POSITION.
TERMINAL NUMBERS ON J1&TB1 TO CORRESPOND. EXAMPLE J1-15, 16 & TB1-15, 16

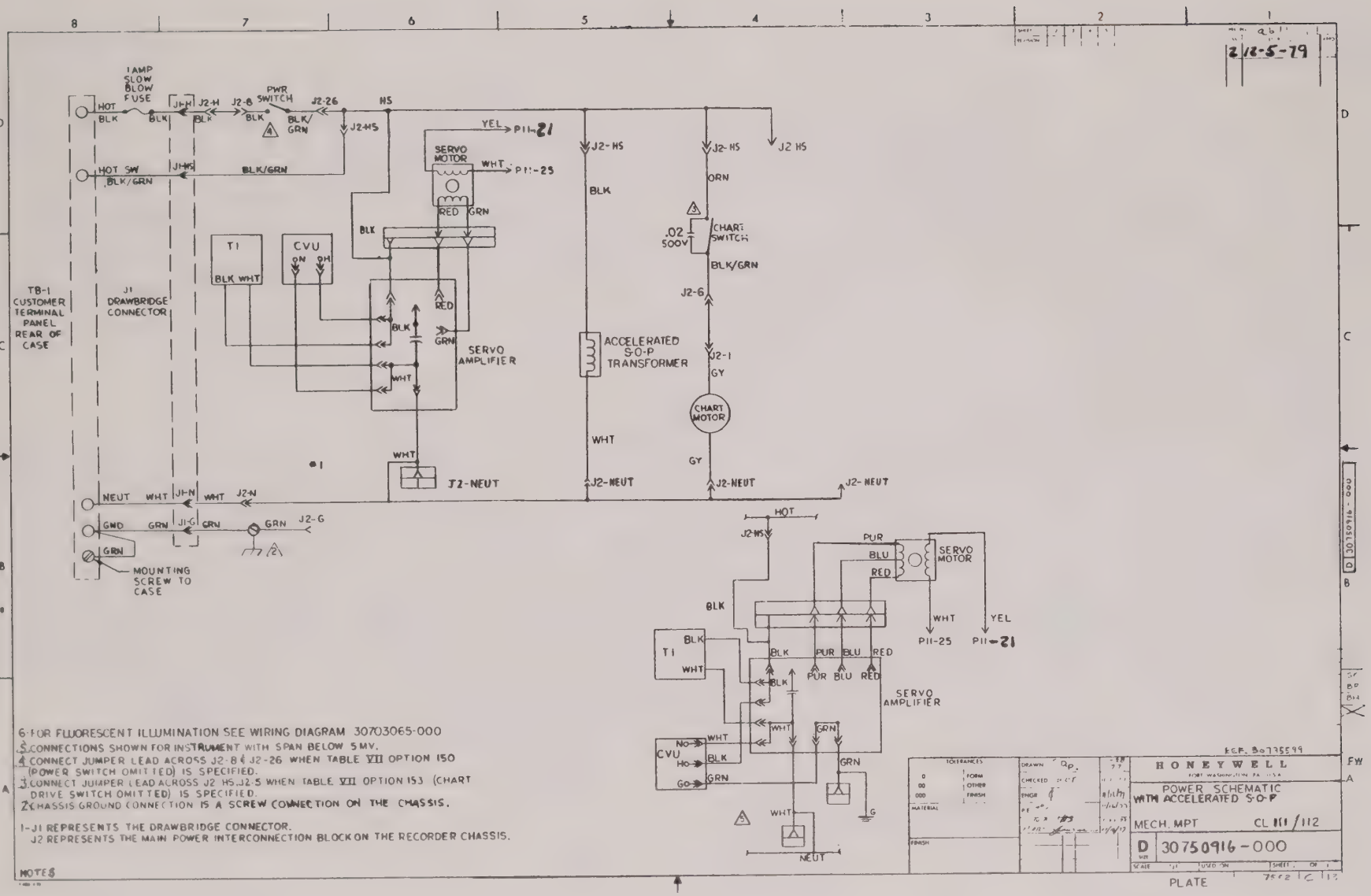
TOLERANCES		DR. JV 6-78	HONEYWELL INC. FORT WASHINGTON, PA., U.S.A.
.0=	FORM ∠ =	CHK. [illegible] 6-78	WIRING DIAGRAM
.00=	OTHER ∠ =	ENGR. ECK 6-78	PROVISION FOR REMOTE CHART SW.
.000=	FINISH √ =	P.E. DJ. 6/78	CL 111 & 112
MATERIAL		REF. 30703114	B 30750415-000
FINISH		CANADA / JAPAN / FRANCE / SCOTLAND / GERMANY	SIZE B · SCALE NONE · USED ON · SHEET 1 OF 1

PLATE 7613 BE

B 30750415-000

SC
BR
BH
FW

1-4303 (4-70)



6-FOR FLUORESCENT ILLUMINATION SEE WIRING DIAGRAM 30703065-000

5-CONNECTIONS SHOWN FOR INSTRUMENT WITH SPAN BELOW 5 MV.

4-CONNECT JUMPER LEAD ACROSS J2-8 & J2-26 WHEN TABLE VII OPTION 150 (POWER SWITCH OMITTED) IS SPECIFIED.

3-CONNECT JUMPER LEAD ACROSS J2 HS, J2-5 WHEN TABLE VII OPTION 153 (CHART DRIVE SWITCH OMITTED) IS SPECIFIED.

2-CHASSIS GROUND CONNECTION IS A SCREW CONNECTION ON THE CHASSIS.

1-J1 REPRESENTS THE DRAWBRIDGE CONNECTOR.
J2 REPRESENTS THE MAIN POWER INTERCONNECTION BLOCK ON THE RECORDER CHASSIS.

NOTES

E.C.F. 30735599

HONEYWELL
HOST WASHINGTON PA. U.S.A.

POWER SCHEMATIC
WITH ACCELERATED S-O-P

MECH. MPT CL 111/112

D 30750916-000

PLATE

OPTION	DESCRIPTION	W/D
TABLE VII 002	FLUORESCENT ILLUMINATION	30703065

REVISIONS		
1	RELEASED 10-30-79	JK
2	REV'D 1-17-80	JK

PRINT CYCLE SENSOR

A K C E

RED GRY YEL BLU

P11-8 P11-14 P11-12 P11-15

PRINT ELECTRONICS TRANSFORMER

YEL → P11-1
ORN → P11-9
PR → P11-11
BLU → P11-18
BRN → P11-16
RED → P11-20

J2-HS BLK
J2-NEUT WHT

TO CORRESPONDING "C" INPUTS ON REAR OF ALTERNATE TB3

ALTERNATE ROTARY INPUT SELECTOR SWITCH

TO CORRESPONDING "A" INPUTS ON REAR OF ALTERNATE TB3

TO CORRESPONDING "A" INPUTS ON REAR OF ALTERNATE TB3

RTB ACTUATION 4 5

ALTERNATE TB3

A B C

V2 V1 V3 V4

TB1

TO CORRESPONDING (—) NUMBERS ON REAR OF TB#3 2 4 5 6

ROTARY INPUT SELECTOR SWITCH

TO CORRESPONDING (+) NUMBERS ON REAR OF TB#3 2 4 5 6

J11-17 RED GRY J11-23

WHT/BRN J11-24

DC CURRENT ACTUATION 4

ALTERNATE TB3

A C

V1 V3

TO TB1

J12 J11

30735438-001

TEMPERATURE COMPENSATOR

PRINT CYCLE MOTOR

BLK BLK BLU YEL

P12-1 P12-2 P12-3 P12-4

CHASSIS

JUMPER J2-10 J2-A

4 JUMPER J2-5 J2 HS

1 JUMPER J2-26 J2-8

FUSE

G NHHS 826 HS NEUT

1 6 F E D C B A 1 4 5 1

2 SERVO MTR. 1 SERVO MTR.

2 SERVO 1 SERVO

SERVO MOTOR

YEL P11-21
WHT P11-25
RED J2-1
GRN J2-3
YEL P11-21
WHT P11-25
BLU J2-1
PR J2-3
RED J2-4
YEL J2-5

6 JUMPER

BLK GY KEY RED GRN BLU

V1A V2A V3A V4A S1H

J1 DRAWBRIDGE CONNECTOR

BLK GY KEY RED GRN BLU

RED BLK GRN BLU

WHT/BLK WHT/GY TO J1

TB3 CUSTOMER TERMINAL PANEL INSIDE OF CASE VIEW

TB1 CUSTOMER TERMINAL PANEL INSIDE OF CASE VIEW

TB1 MOUNTING SCREW CASE

REBALANCING SLIDEWIRE

RED WHT BLK BLU

MEASURING CIRCUIT

CVU T1

SERVO AMPLIFIER

SERVO UNIT MOUNTED UNDER CHASSIS

AMPLIFIER CONNECTOR 3

POWER SW. 1 CHART SWITCH 4

RED To J2-26 BLK To J2-8 RED To J2-6 BLK To J2-HS

CHART MOTOR 5

GY To J2-NEUT GY To J2-1

2 INPUTS RTB 4

6 INPUTS RTB 4

3 INPUTS RTB 4

4 INPUTS RTB 4

1 "B" CONTACTS NOT USED ON 24 RECORD RECORDERS.

1 DC CURRENT ACTUATION TO "C" INPUTS ON ALTERNATE TB 3.

2 DC CURRENT ACTUATION TO "A" INPUTS ON ALTERNATE TB 3.

3 DC CURRENT REQUIRES A SHUNT RESISTOR FOR EACH INPUT WHICH IS MOUNTED ON ALTERNATE TB3. 2,3,4,5 & 6 INPUT OPERATION IS OBTAINED WITH THE STANDARD SHORTING PLUGS AS SHOWN IN NOTE 4.

4 RTB ACTUATIONS WITH 2,3,4,5,6 INPUTS REQUIRE SHORTING JUMPERS MOUNTED EXTERNALLY OF THE ALTERNATE TB3 & WIRED AS SHOWN FOR THE SHORTING PLUG IN NOTE 4.

5 V2 & V4 ARE JUMPERED TOGETHER AT THE MEASURING CIRCUIT FOR ALL ACTUATIONS EXCEPT THERMOCOUPLE & RTB.

6 CONNECTIONS SHOWN FOR INSTRUMENT WITH SPAN BELOW 5 MV.

7 CONNECTIONS FOR BASIC CHART SPEEDS THRU 20"/HOUR SHOWN.

8 CONNECT JUMPER ACROSS J2-5 & J2-HS WHEN TABLE VII OPTION 153 IS SELECTED.

9 THESE LEADS CONNECT TO UNDERSIDE OF J2.

10 FOR INSTRUMENTS WITH LESS THAN 12 INPUTS A SHORTING PLUG MUST BE USED. SEE BELOW FOR SHORTING PLUG WIRING.

11 WHEN INSTRUMENT IS SUPPLIED WITHOUT POWER SW (TABLE VII OPTION 50) A JUMPER IS PLACED ACROSS TERMINALS 26 & 8.

NOTES -

REF 30735601

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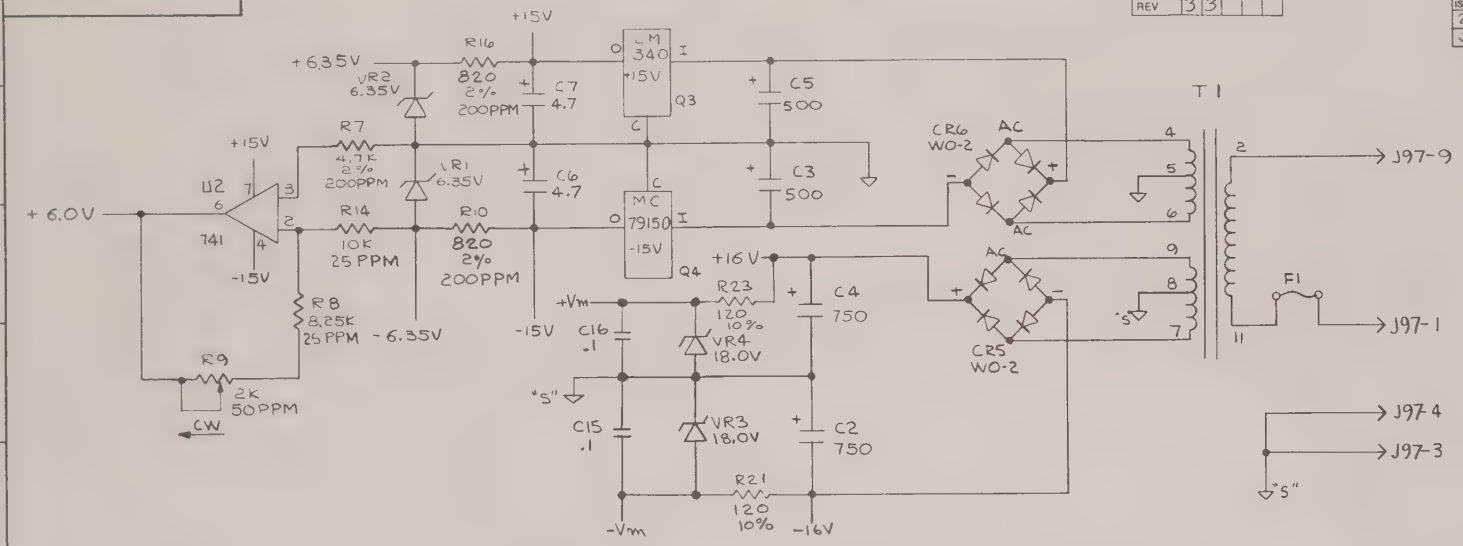
WIRING DIAGRAM ACCELERATED SOP. MECH. MPT. CL III / 112

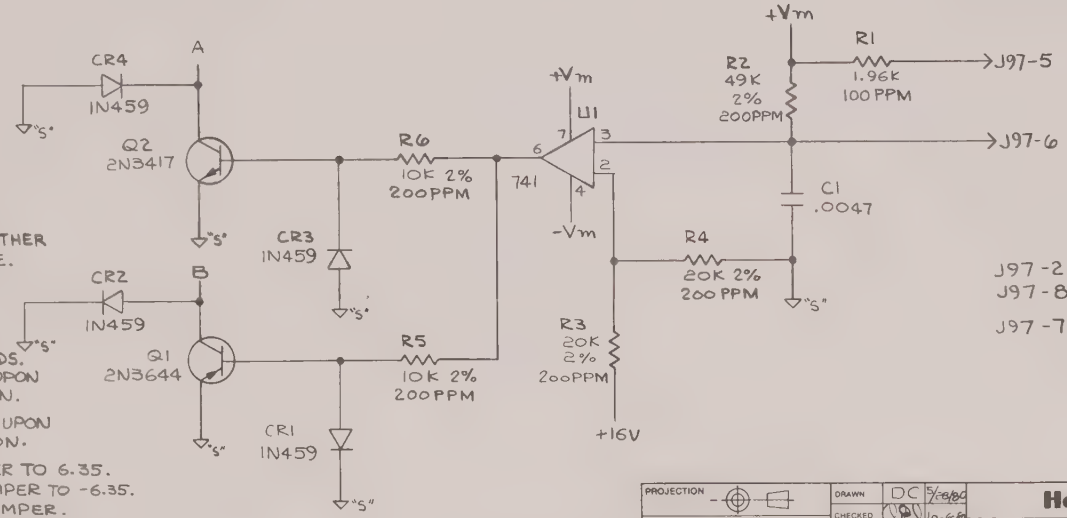
SCALE NONE

D 30750917-000

PLATE

ENGNG REF 7552 C 15





5. R41 & R42 ARE PACKAGED TOGETHER IN THE MEAS. CIRCUIT MODULE.

4 - UNLESS OTHERWISE SPECIFIED:
(a) RESISTANCE IS IN OHMS.
(b) RESISTOR WATTAGE IS 1/4 WATT.
(c) RESISTOR TOL. IS ± 1%
(d) CAPACITANCE IS IN MICROFARADS.

3. TO BE SELECTED DEPENDING UPON CUSTOMER RANGE 2 SELECTION.

2. TO BE SELECTED DEPENDING UPON CUSTOMER RANGE 1 SELECTION.

1. FOR UPSCALE BURNOUT, JUMPER TO 6.35. FOR DOWNSCALE BURNOUT JUMPER TO -6.35. FOR NO BURNOUT, DO NOT JUMPER. VALUE TO BE SELECTED DEPENDING UPON RANGE.

NOTES:

SHEET	1	2	3	4	5
REV	3	3			

PRE REL	ADC	J	1	2	
ISS	REVISION & DATE				APPD
2	RELEASED 2-25-81				LJ
3	REV'D 4/14/81				LT

C 30751419-000

SC BH FW

PROJECTION	DRAWN	DC	5/6/80
LINEAR MEASURE: mm IN	CHECKED		10-6-80
	DEV ENGR		10-6-80
MATERIAL	MFG ENGR		10-6-80
	QA ENGR		10-6-80
FINISH	MAT ENGR		10-6-80
	TOLERANCE UNLESS NOTED		
	ANGULAR DIMENSION		

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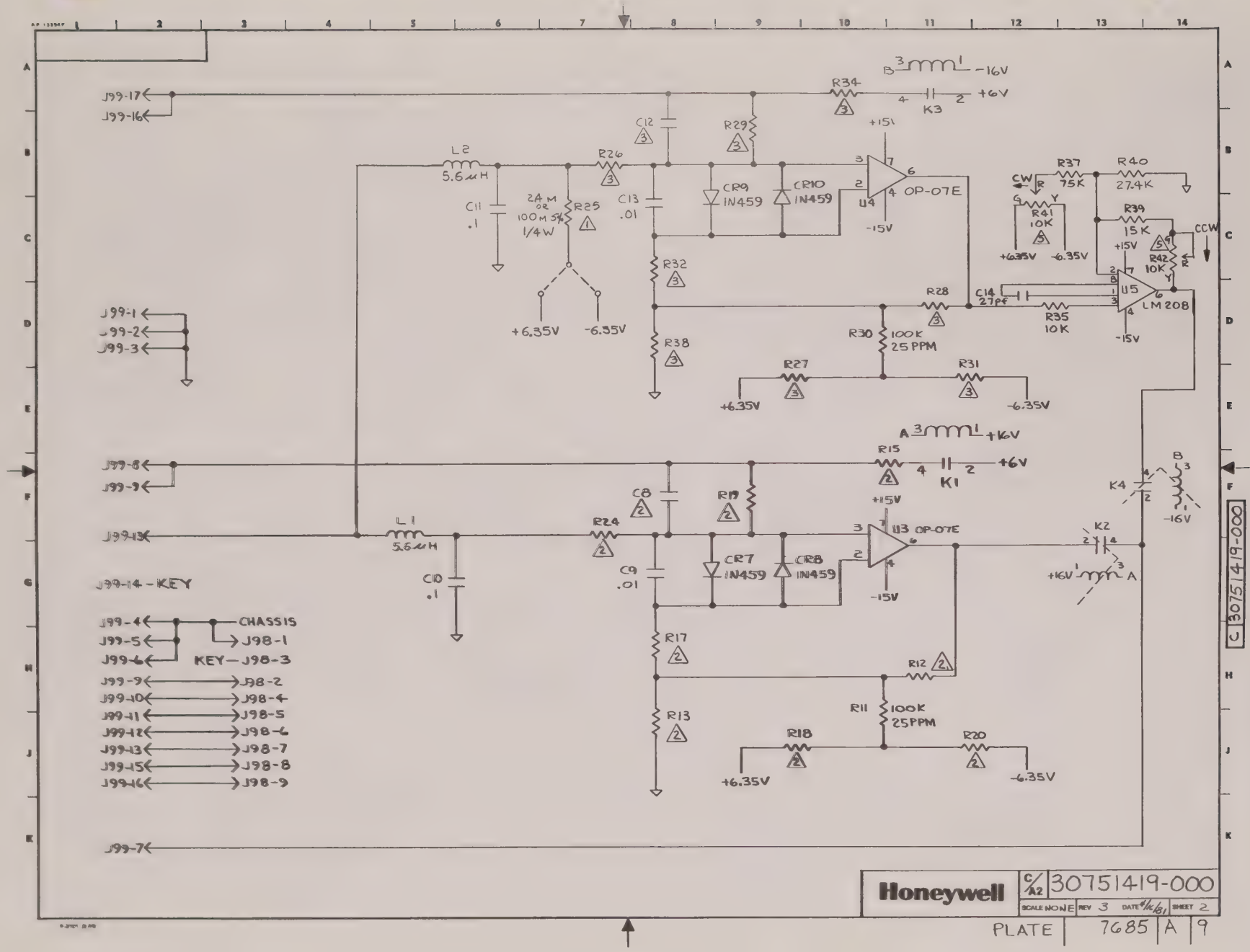
SCHEMATIC DUAL RANGE 111/112

C/A2 30751419-000

SCALE NONE | USED ON 30751418 | SHT 1 OF 2

DO NOT SCALE DWG

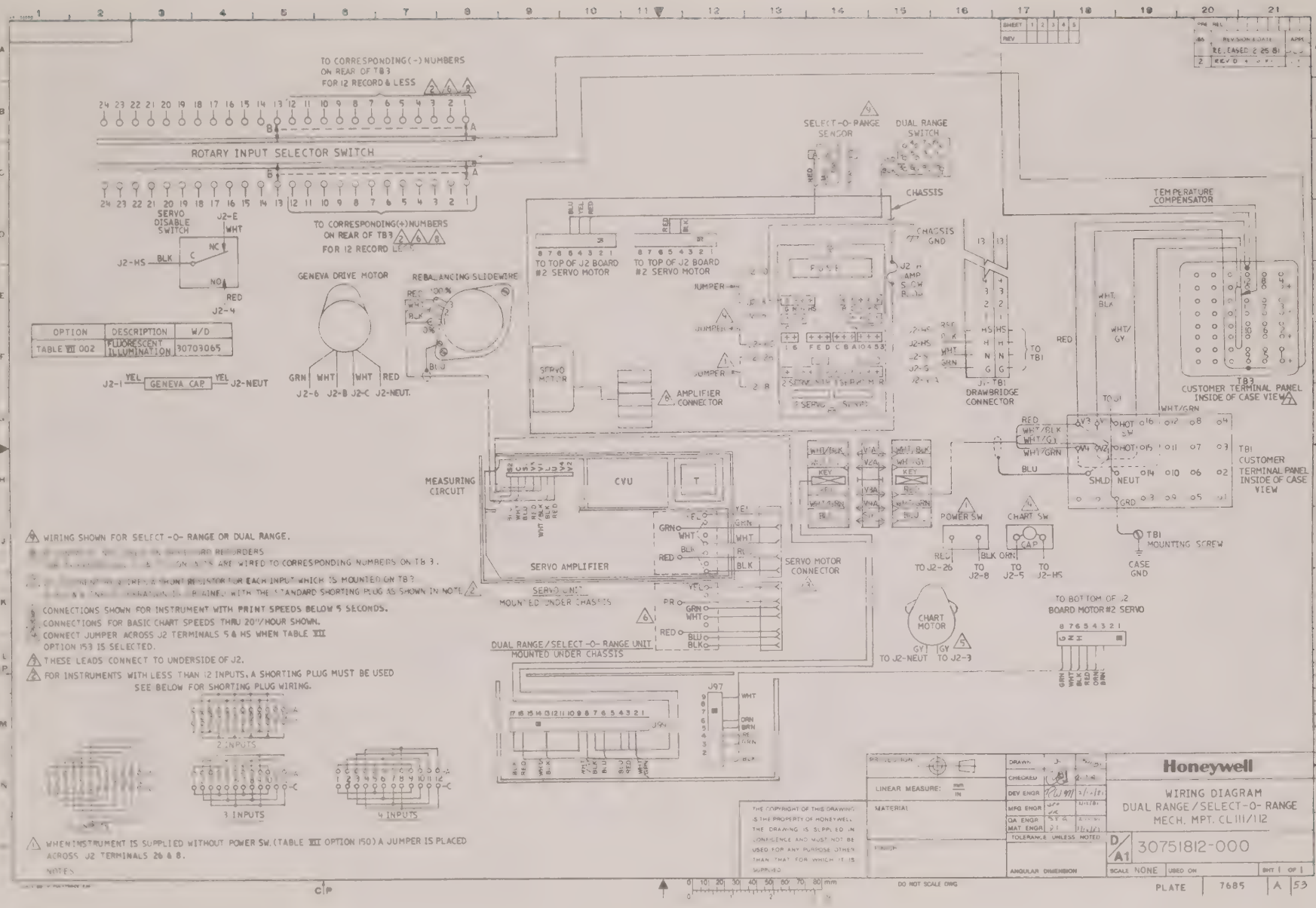
PLATE | 7685 | A | 9



C 30751419-000

Honeywell	C/A2	30751419-000
	SCALE NONE	REV 3 DATE 4/16/81 SHEET 2

PLATE 7685 A 9


TO CORRESPONDING(-)NUMBERS ON REAR OF TB3 FOR 12 RECORD & LESS
ROTARY INPUT SELECTOR SWITCH
TO CORRESPONDING(+)NUMBERS ON REAR OF TB3 FOR 12 RECORD LESS
SERVO DISABLE SWITCH
J2-E
WHT
J2-HS
BLK
NC
C
NO
RED
J2-4
OPTION | DESCRIPTION | W/D
TABLE VII 002 | FLUORESCENT ILLUMINATION | 30703065
J2-1 YEL GENEVA CAP YEL J2-NEUT
GENEVA DRIVE MOTOR
REBALANCING SLIDEWIRE
GRN WHT WHT RED
J2-6 J2-B J2-C J2-NEUT.
SELECT-O-RANGE SENSOR
DUAL RANGE SWITCH
CHASSIS
TO TOP OF J2 BOARD #2 SERVO MOTOR
TO TOP OF J2 BOARD #2 SERVO MOTOR
CHASSIS GND
FUSE
JUMPER
SERVO MOTOR
AMPLIFIER CONNECTOR
TO TBI
J1-TBI DRAWBRIDGE CONNECTOR
TEMPERATURE COMPENSATOR
TB3
CUSTOMER TERMINAL PANEL INSIDE OF CASE VIEW
TBI
CUSTOMER TERMINAL PANEL INSIDE OF CASE VIEW
MEASURING CIRCUIT
CVU
T
SERVO AMPLIFIER
SERVO UNIT MOUNTED UNDER CHASSIS
SERVO MOTOR CONNECTOR
POWER SW
CHART SW
TO J2-26
TO J2-8
TO J2-5
TO J2-HS
TBI MOUNTING SCREW
CASE GND
CHART MOTOR
TO J2-NEUT
TO J2-3
TO BOTTOM OF J2 BOARD MOTOR #2 SERVO
GRN WHT BLK RED BLU GRN
DUAL RANGE/SELECT-O-RANGE UNIT MOUNTED UNDER CHASSIS
J97
J99
WIRING SHOWN FOR SELECT-O-RANGE OR DUAL RANGE.
CONNECTIONS SHOWN FOR INSTRUMENT WITH PRINT SPEEDS BELOW 5 SECONDS.
CONNECTIONS FOR BASIC CHART SPEEDS THRU 20"/HOUR SHOWN.
CONNECT JUMPER ACROSS J2 TERMINALS 5 & HS WHEN TABLE XII OPTION 153 IS SELECTED.
THESE LEADS CONNECT TO UNDERSIDE OF J2.
FOR INSTRUMENTS WITH LESS THAN 12 INPUTS, A SHORTING PLUG MUST BE USED SEE BELOW FOR SHORTING PLUG WIRING.
2 INPUTS
3 INPUTS
4 INPUTS
WHEN INSTRUMENT IS SUPPLIED WITHOUT POWER SW. (TABLE XII OPTION 150) A JUMPER IS PLACED ACROSS J2 TERMINALS 26 & 8.
NOTES
Honeywell
WIRING DIAGRAM
DUAL RANGE/SELECT-O-RANGE
MECH. MPT. CL111/112
D/A1 30751812-000
SCALE NONE
PLATE 7685 A 53
LINEAR MEASURE: mm IN
MATERIAL
ANGULAR DIMENSION
DO NOT SCALE DWG
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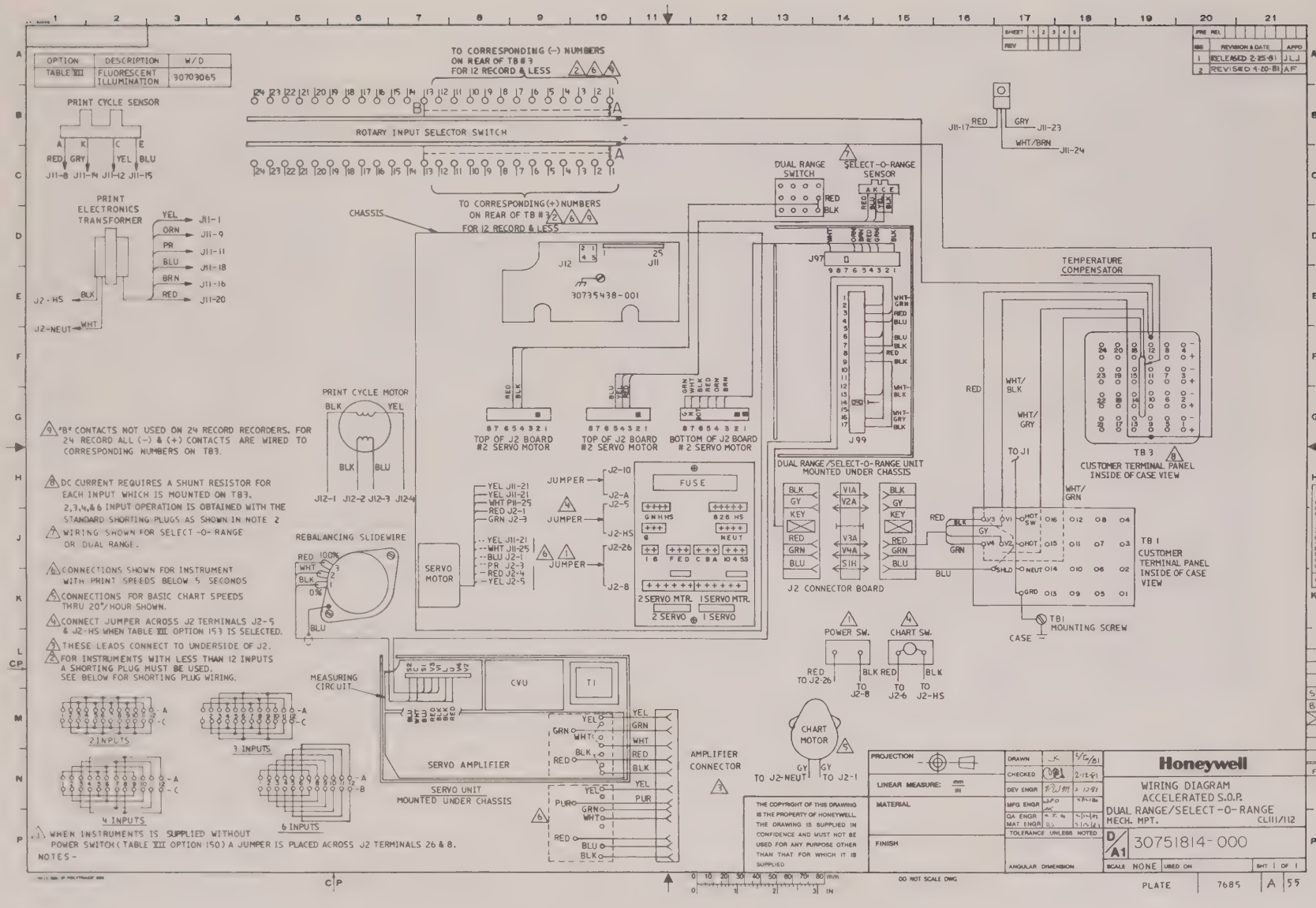
OPTION TABLE XIII
DESCRIPTION FLUORESCENT ILLUMINATION
W/D 30703065
PRINT CYCLE SENSOR
A K C E
RED GRY YEL BLU
J11-8 J11-14 J11-12 J11-15
PRINT ELECTRONICS TRANSFORMER
YEL J11-1
ORN J11-9
PR J11-11
BLU J11-18
BRN J11-16
RED J11-20
J2-HS BLK
J2-NEUT WHT
TO CORRESPONDING (-) NUMBERS ON REAR OF TB #3 FOR 12 RECORD & LESS
ROTARY INPUT SELECTOR SWITCH
TO CORRESPONDING (+) NUMBERS ON REAR OF TB #3 FOR 12 RECORD & LESS
CHASSIS
J12
J11
30735438-001
DUAL RANGE SWITCH
SELECT-O-RANGE SENSOR
J11-17 RED
GRY J11-23
WHT/BRN J11-24
J97
J99
TEMPERATURE COMPENSATOR
TB 3
CUSTOMER TERMINAL PANEL INSIDE OF CASE VIEW
TOP OF J2 BOARD #2 SERVO MOTOR
BOTTOM OF J2 BOARD #2 SERVO MOTOR
DUAL RANGE/SELECT-O-RANGE UNIT MOUNTED UNDER CHASSIS
TO J1
PRINT CYCLE MOTOR
BLK YEL BLK BLU
J12-1 J12-2 J12-3 J12-4
REBALANCING SLIDEWIRE
RED 100%
WHT
BLK
0%
BLU
SERVO MOTOR
YEL J11-21
WHT J11-25
BLU J2-1
PR J2-3
RED J2-4
YEL J2-5
JUMPER
J2-10
J2-A
J2-5
J2-HS
J2-26
J2-8
FUSE
GNHHS
826 HS
NEUT
2 SERVO MTR.
1 SERVO MTR.
2 SERVO
1 SERVO
J2 CONNECTOR BOARD
TB 1
CUSTOMER TERMINAL PANEL INSIDE OF CASE VIEW
TB1 MOUNTING SCREW
CASE
POWER SW.
CHART SW.
RED TO J2-26
BLK TO J2-8
RED TO J2-6
BLK TO J2-HS
CHART MOTOR
GY TO J2-NEUT
GY TO J2-1
MEASURING CIRCUIT
CVU
TI
SERVO AMPLIFIER
SERVO UNIT MOUNTED UNDER CHASSIS
AMPLIFIER CONNECTOR
2 INPUTS
3 INPUTS
4 INPUTS
6 INPUTS
NOTES -
1. WHEN INSTRUMENTS IS SUPPLIED WITHOUT POWER SWITCH (TABLE III OPTION 150) A JUMPER IS PLACED ACROSS J2 TERMINALS 26 & 8.
2. "B" CONTACTS NOT USED ON 24 RECORD RECORDERS. FOR 24 RECORD ALL (-) & (+) CONTACTS ARE WIRED TO CORRESPONDING NUMBERS ON TB3.
3. DC CURRENT REQUIRES A SHUNT RESISTOR FOR EACH INPUT WHICH IS MOUNTED ON TB3. 2,3,4,& 6 INPUT OPERATION IS OBTAINED WITH THE STANDARD SHORTING PLUGS AS SHOWN IN NOTE 2
4. WIRING SHOWN FOR SELECT-O-RANGE OR DUAL RANGE.
5. CONNECTIONS SHOWN FOR INSTRUMENT WITH PRINT SPEEDS BELOW 5 SECONDS
6. CONNECTIONS FOR BASIC CHART SPEEDS THRU 20"/HOUR SHOWN.
7. CONNECT JUMPER ACROSS J2 TERMINALS J2-5 & J2-HS WHEN TABLE XIII OPTION 153 IS SELECTED.
8. THESE LEADS CONNECT TO UNDERSIDE OF J2.
9. FOR INSTRUMENTS WITH LESS THAN 12 INPUTS A SHORTING PLUG MUST BE USED. SEE BELOW FOR SHORTING PLUG WIRING.
PRE REL
REV 1 RELEASED 2-25-81 JLJ
REV 2 REVISED 4-20-81 AF
PROJECTION
LINEAR MEASURE: mm IN
MATERIAL
FINISH
TOLERANCE UNLESS NOTED
ANGULAR DIMENSION
DRAWN 2/6/81
CHECKED 2-12-81
DEV ENGR 2-12-81
MFG ENGR 4-20-81
QA ENGR 4-20-81
MAT. ENGR 4/20/81
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DO NOT SCALE DWG
Honeywell
WIRING DIAGRAM ACCELERATED S.O.P. DUAL RANGE/SELECT-O-RANGE
MECH. MPT. CL111/112
D/A1 30751814-000
SCALE NONE
SHT 1 OF 1
PLATE 7685 A 55
D 30751814-000

Honeywell Charts

Honeywell charts are specially designed and made exclusively for use with the Honeywell recorder and are calibrated and tested to insure the very best of records. As the owner of Honeywell recorders, you will naturally want to help maintain its high accuracy and sensitivity by using Honeywell charts.

There are two types of charts, circular and strip, and each type and size is available with a wide variety of ranges and calibrations to suit your every need.

Here are the features that make Honeywell charts the highest quality charts available. Along every step of the production line—from the blending of wood pulps to the packaging and shipping of your charts—strict requirements and controls are enforced to guarantee the quality and precision workmanship so necessary to best serve your needs.

Features

COMPOSITION
All Honeywell charts are made from 100% bleached chemical wood pulp, free from groundwood, de-inked stock, or low-grade pulps. This guarantees uniformity throughout.

STRENGTH
Special treatments of all chart papers give the best writing surface; charts are treated for wet strength so that an oscillating pen will not feather or break through.

DIMENSIONAL STABILITY
The expansion or contraction of chart papers will not exceed an average of 1% from 10 to 85% relative humidity change. And we're continually working to reduce this low figure.

CALIBRATION
An electronic computer which calculates the number of graduations, the degrees of thickness of each line marking, and the exact distances between lines, provides the most accurate, uniform charts available.

HUMIDITY COMPENSATION
Standard strip charts have elongated holes on one side. This permits any fractional expansion or contraction of chart, due to changes in humidity, to take place in least-used portion of chart.

SMOOTHNESS
The high-quality pulp, uniform thickness, and expertly controlled calendering of Honeywell chart paper insure a smooth surface that will offer a negligible amount of resistance to the recording pen.

BRIGHTNESS
All Honeywell charts are easy to read because they have a brightness rating of 77 to 87 as measured on a G.E. brightness meter. Your operators can easily see chart graduations, time markings, recording marks, etc.

APPEARANCE
All Honeywell charts are clean, well-formed, and free of dirt particles, slime spots, holes, and similar defects.

SPECIAL PAPER
Charts can be made to order in special colors and special papers (such as Vellum for excellent reproducibility).

PACKAGING
All strip charts are rolled on a cardboard spool that easily fits into position in the recorder. Strip Charts are packaged individually; circular charts 100 to a box. All boxes have adequate space to record dates, etc., and serve as convenient, space saving containers for storing charts after use.

Specifications

STRIP CHARTS

Honeywell Recorder	*VumatiK* and *VutroniK*	*Model 1113*	*Model*		*Models 153 and 1123*
			195	*196*	
Chart Roll Size	4.328"	6.5"	6.5"	11.3"	12"
Calibrated Width	4"	6"	6"	10.433"	11"
Length	53 ft.	122 ft.	122 ft.		122 ft.
Line Color	Beige	Gray	Green		Blue
Number Color	Black	Black	Green		Black
Std. Time Markings	3/4", 1", 1-1/2"	1/2", 1", 2", 4"	10 lines/"		1/2", 1", 2", 4"
Packaged Unit/box	1 roll	1 roll	1 roll		1 roll

CIRCULAR CHARTS

Honeywell Recorder	*ElectroniK 1112*	RH and Temperature Class 612	Model AR100	Class 60, 70	Class 152, 22, 45, 47, 60 & 70
Chart Diameter	6.5"	8"	10.34"	10"	12"
Calibrated Width	3"	3.268"	100 mm	4.75"	4.75"
Line Color	Beige	Blue	Beige	Blue	Blue
Number Color	Beige	Blue	Beige	Blue	Blue
Packaged Unit/Box	100	100	100	100	100

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#91-00-99-02

Use Honeywell charts and ink

Remember . . . the quality of the record is only as good as the chart paper and ink that is used. Your new Honeywell recorder includes Honeywell chart and ink and we urge you to continue to use only these same products when replacement is necessary.

None better . . . there is no better quality available anywhere than we furnish in Honeywell charts and you can continue to obtain this high quality recording performance by specifying the number that appears on the chart and ordering it from your local Honeywell sales office.

They're ready . . . we inventory hundreds of thousands of charts which are available for immediate shipment to you. In fact, we can ship within 24 hours when you need it.

Use Honeywell sensors

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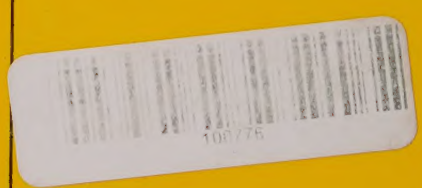

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